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World Data Center A For Rockets and Satellites

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# Launch Summary for 1978



August 1979

NSSDC/WDC-A-R&S 79-04

Launch Summary

for

1978

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August 1979

National Space Science Data Center  
National Aeronautics and Space Administration  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

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## INTRODUCTION

### Purpose

World Data Center A for Rockets and Satellites (WDC-A-R&S) collects and exchanges reports of sounding rocket launches; reports of satellite and space probe launchings; descriptive information on spacecraft experiments; scientific reports on results of experiments that receive a limited distribution; data supporting conclusions when not included in the published reports; and precise positional observations, orbital elements, and ephemerides that are of great scientific interest and value. Original (raw) or calibrated (reduced or analyzed) data are not normally deposited in the subcenters for rockets and satellites. Data related to rocket and satellite launchings are summarized in the Launch Summary. This report replaces the annual World Data Center A Rockets and Satellites Catalogue of Data, which was last published in 1975.

This document is in accordance with international agreements concerning international exchange of rocket and satellite data adopted by the Committee on Space Research (COSPAR) in May 1962 and published in COSPAR Information Bulletin No. 9, Part I, July 1962. The COSPAR Guide to Rocket and Satellite Information and Data Exchange was incorporated in full by the Comité International de Geophysique (CIG) into the overall Guide to International Data Exchange through the World Data Centers for the Period 1960-Onwards (published November 1963). These agreements were modified to include recommendations for improving the exchange of information and data, and a revised COSPAR Guide to Rocket and Satellite Information and Data Exchange was adopted by COSPAR in May 1972 and published in COSPAR Transactions No. 8, Part I, December 1972.

The current plans for continued international exchange of solar-terrestrial data through the WDC's were set forth in the STP NOTES No. 6 and incorporated with slight modifications in the Third Consolidated Guide to International Data Exchange through the World Data Centres, published in December 1973 by the International Council of Scientific Unions (ICSU) panel on World Data Centers. A fourth revision was published in June 1979.

### NSSDC Facilities and Services

The National Space Science Data Center (NSSDC) provides facilities for reproduction of data and for onsite data use. Resident and visiting researchers are invited to study data while at the Data Center. The Data Center staff will assist users with additional data searches and with the use of equipment. Advance notice of such a visit enables the staff to provide better services to the data user. In addition to rocket information and satellite data, the Data Center maintains some supporting information and other supporting data that may be related to the needs of researchers.

The services provided by NSSDC are available to any individual or organization resident in the United States and to researchers outside the United States through WDC-A-R&S. Normally a charge is made for the requested data to cover the cost of reproduction and the processing of the request. The

researcher will be notified of the charge, and payment must be received prior to processing the request. However, as resources permit, the Director of NSSDC/WDC-A-R&S may waive the charge for modest amounts of data when they are to be used for scientific studies or for specific educational purposes and when they are requested by an individual affiliated with: (1) NASA installations, NASA contractors, or NASA grantees; (2) other U.S. Government agencies, their contractors, or their grantees; (3) universities or colleges; (4) state or local governments; or (5) nonprofit organizations.

The Data Center's address for requests is:

National Space Science Data Center  
Code 601.4  
Goddard Space Flight Center  
Greenbelt, Maryland 20771  
[Telephone: (301) 344-6695]

Researchers who reside outside the U.S. should direct requests for data to:

World Data Center A for Rockets and Satellites  
Code 601  
Goddard Space Flight Center  
Greenbelt, Maryland 20771  
U.S.A.  
[Telephone: (301) 344-6695]

### Organization

This issue of the *Launch Summary* is a summary of launchings identified by NSSDC/WDC-A-R&S from launching reports received for the period January 1, 1978, through December 31, 1978. There are two major sections to this edition: Sounding Rockets, and Artificial Earth Satellites and Space Probes.

The Sounding Rockets section contains a summary listing of sounding rocket launchings and a listing of the experimenters associated with the launchings and their addresses. There is also an index of launch sites and two tables giving the meanings and the codes used in the launch listing for the Experiment Discipline and Instrument categories. A sample rocket launching report form is also included. The Artificial Earth Satellites and Space Probes section includes a summary listing of satellite and space probe launchings, and a sample satellite or space probe launching report form. (The satellite and space probe launch listing, as well as the sounding rocket launch listing and the launch site index in the Sounding Rocket section, were all generated from the NSSDC information system.) There are also two appendixes to this document. Appendix 1 is a description of the World Data Centers, including functions and responsibilities. Appendix 2 gives the addresses of the WDC-A Coordination Office and seven subcenters.

NSSDC/WDC-A-R&S welcomes comments regarding errors in this report. Recommendations directed to the appropriate address in reference to the overall contents and organization of this *Launch Summary* would also be appreciated.

## SOUNDING ROCKETS

### Launch Listings

The listing of sounding rocket launchings was generated using the NSSDC Rocket File. This file is compiled from reports of rocket launchings, national reports to COSPAR, and scientific publications. The Rocket File is used for such listings because it facilitates easy sorting, selecting, updating, and report generation.

The listing is a summary of launchings identified between January 1, 1978, and December 31, 1978. Information extracted from the file for this time-ordered printout are: date and time of launch (universal time); the agency rocket identification; the sponsoring country or countries (sponsored in this context means that the country provided scientists (experimenters), support personnel (such as launch crews), equipment (rocket vehicles, launch facilities), or funds for the launch); the launch site; experiment disciplines; instruments used for the experiment; experimenters or institutions involved in the launching; and the peak altitude achieved by the rocket.

When the launch site is on board a ship, the coordinates of the ship location at time of launch are included, if known. Table 1 is a list of the launch sites identified to date. When launch sites have changed names or are in close proximity to one another, usually only one name is used.

The scientific disciplines with which the experiments are concerned are coded, as well as can be determined, from the information provided in the launch report. The disciplines are divided into 10 general categories, each of which may have up to 13 subcategories, as can be seen in Table 2.

When possible, the type of instrumentation used on a particular rocket flight was selected from a standard coded list of instruments. In preparing this list, the instrument energy converter or sensor function was emphasized, and the collimating, concentrating, selecting, comparing, and amplification characteristics were largely ignored. Table 3 shows the codes in use.

Some rocket launches are not reported in the *Launch Summary* because the launching agencies did not provide the necessary information to WDC-A-R&S. Because the value of this publication increases with the number of flights reported, all agencies with knowledge of rocket launches are encouraged to announce launchings to WDC-A-R&S at the address given earlier, preferably by means of the form shown in Figure 1. Copies of this form may be obtained from WDC-A-R&S.

Table 1. List of Launch Sites

SITE NAME	SITE LOCATION	GEOGRAPHIC		GEOMAGNETIC		ADD FOR UNIVERSAL TIME
		LAT	E LONG	LAT	E LONG	
ABERPORTH	WALES	52.09	353.67	55.44	79.76	-1.0 HR.
AKITA	JAPAN	39.57	140.07	29.47	205.45	-9.0 HR.
AKITA-KEN	SEE AKITA					
AKITA-SHI	SEE AKITA					
ALASKA ROCKET RANGE	SEE FAIRBANKS					
ANDENES	SEE ANDOYA					
ANDOYA	NORWAY	69.30	16.02	67.34	113.94	-1.0 HR.
ANTIGUA	WEST INDIES	17.15	298.22	28.53	7.85	+4.0 HR.
ARECIBO	PUERTO RICO	18.50	293.17	29.99	2.38	+4.0 HR.
ARENOSILLO	SEE EL ARENOSILLO					
ASCENSION ISLAND	EQUATORIAL ATLANTIC	-7.98	345.58	-1.24	53.83	+0.0 HR.
ATLANTIC MISSILE RANGE	SEE CAPE CANAVERAL					
BARBADOS	WINDWARD ISLANDS	13.05	300.30	24.38	10.17	+4.0 HR.
BARKING SANDS	SEE KAUAI					
BARREIRA DO INFENNO	SEE NATAL					
BARROW	USA/ALASKA	71.33	203.22	68.54	241.11	+10.0 HR.
BARTER ISLAND	USA/ALASKA	70.12	216.37	69.97	253.17	+10.0 HR.
BERMUDA	N ATLANTIC	32.20	295.55	43.66	5.32	+4.0 HR.
CAMP TORTUGUENA	SEE ARECIBO					
CAMP TUTO	SEE THULE/CAMP TUTO					
CAPE CANAVERAL	USA/FLORIDA	28.45	279.47	39.63	346.72	+5.0 HR.
CAPE KARIKARI	NEW ZEALAND	-34.00	173.50	-38.63	250.28	-12.0 HR.
CAPE KENNEDY	SEE CAPE CANAVERAL					
CAPE PARRY	CANADA/NORTHWEST TERRITORIES	70.17	235.28	73.72	269.94	+8.0 HR.
CARNARVON	AUSTRALIA/WESTERN AUSTRALIA	-24.50	113.40	-35.99	182.70	-8.0 HR.
CASSINO	BRAZIL	-32.20	307.83	-21.14	15.23	+3.0 HR.
CELPA	SEE CHAMICAL					
CELPA ATLANTICO	SEE MAR CHIQUITA					
CENTRE SPATIAL GUYANAIS	SEE KOUROU					
CHAMICAL	ARGENTINA	-30.33	293.68	-18.84	2.45	+4.0 HR.
CHILCA	PERU	-12.50	283.20	-1.11	352.19	+5.0 HR.
CHURCHILL	SEE FORT CHURCHILL					
COLOMB BECHAN	SEE HAMMAGUIR					
CORONIE	SURINAM (DUTCH GUAYANA)	5.85	303.70	17.06	15.21	+4.0 HR.
CROATAN (SHIP)	VARIOUS OCEANS AND SEAS					
DEFIANCE (SHIP)	VARIOUS OCEANS AND SEAS					
DUMONT D'URVILLE	ANTARCTICA	-64.67	140.02	-73.80	228.07	-9.0 HR.
EAST GUDDY	CANADA/NEWFOUNDLAND	44.90	296.58	56.33	7.16	+4.0 HR.
EASTERN TEST RANGE	SEE CAPE CANAVERAL					
EGLIN AIR FORCE BASE	USA/FLORIDA	30.38	273.30	41.26	33.58	+6.0 HR.
EL ARENOSILLO	SPAIN	37.10	353.27	41.69	70.98	-1.0 HR.
ESRANGE	SEE KIRUNA					
FAIRBANKS	USA/ALASKA	65.00	212.40	64.79	256.58	+10.0 HR.
FORT CHURCHILL	CANADA/MANITOBA	58.73	266.18	68.67	323.20	+6.0 HR.
FORT GREELY	USA/ALASKA	64.00	214.88	64.38	259.86	+10.0 HR.
FORT SHERMAN	PANAMA	9.33	280.02	20.61	348.42	+5.0 HR.
FORT WAINWRIGHT	SEE FAIRBANKS					
FOX MAIN	CANADA/NORTHWEST TERRITORIES	68.77	278.78	80.23	353.11	+5.0 HR.
G.USHAKOV (SHIP)	VARIOUS OCEANS AND SEAS					
GEOPOLE STATION	SEE THULE/CAMP TUTO					
GILLAN	CANADA/MANITOBA	55.92	264.00	65.57	321.87	+6.0 HR.
GREEN RIVER	USA/UTAH	38.93	249.94	47.11	311.34	+7.0 HR.
GUAM	N PACIFIC	13.50	144.67	3.97	212.89	+10.0 HR.
HALL BEACH	SEE FOX MAIN					
HAMMAGUIR	ALGERIA	30.90	356.92	34.91	72.91	+0.0 HR.
HEISS ISLAND	FRANZ JOSEF LAND	80.62	58.05	71.31	156.06	-5.0 HR.
HOLLAND AFB	SEE WHITE SANDS					
HUELVA	SEE EL ARENOSILLO					
ILE DU LEVANT	FRANCE	43.05	06.47	44.87	86.48	+0.0 HR.
JOHNSTON ATOLL	SEE JOHNSTON ISLAND					
JOHNSTON ISLAND	EQUATORIAL PACIFIC	16.75	190.48	14.33	236.34	+11.0 HR.
KAGOSHIMA	JAPAN	31.25	131.07	20.38	190.24	-9.0 HR.
KAGOSHIMA SPACE CENTER	SEE KAGOSHIMA					
KAPUSTIN YAR	U.S.S.R.	48.52	45.80	42.75	125.04	-4.0 HR.
KARACHI	SEE SONHIANI					
KARISKARI	SEE CAPE KARIKARI					
KARYSTOS	GREECE	38.02	24.42	36.46	102.12	-2.0 HR.
KAUAI	USA/HAWAIIAN ISLANDS	22.07	200.23	21.50	264.70	+11.0 HR.
KERGUELEN ISLAND	INDIAN OCEAN	-48.83	70.00	-56.79	127.95	-5.0 HR.
KUVEENAW	USA/RICHICAN	47.43	272.28	58.14	335.71	+6.0 HR.
KHEYSIA ISLAND	SEE HEISS ISLAND					
KIRUNA	SWEDEN	67.90	21.10	65.3	115.8	-1.0 HR.
KOROLEV (SHIP)	VARIOUS OCEANS AND SEAS					
KORONI BEACH	GREECE	36.77	21.95	35.73	99.38	-2.0 HR.
KOUROU	FRENCH GUIANA	5.20	307.27	16.04	16.60	+4.0 HR.
KRENKEL OBSERVATORY	SEE HEISS ISLAND					
KRENKEL (SHIP)	VARIOUS OCEANS AND SEAS					
KRONOGARD	SWEDEN	66.22	19.78	69.95	113.95	-1.0 HR.
KUJALEIN	MARSHALL ISLANDS	8.73	167.73	2.33	235.80	-12.0 HR.
LANDES TEST CENTER	SEE TEST CENTER OF LANDES					
LAPAN SPACE CENTER	INDONESIA	-6.27	106.87	-17.74	175.69	-7.0 HR.
LEBA	POLAND	54.47	17.33	53.60	102.24	-1.0 HR.
LENINSK	SEE TYURATAM					
MAR CHIQUITA	ARGENTINA	-37.75	302.58	-26.48	10.21	+4.0 HR.
MAR DEL PLATA	SEE MAR CHIQUITA					
MARAMBIO	SEE VICECOMEDORO MARAMBIO					
MCHURDO	ANTARCTICA	-77.50	165.00	-79.13	291.78	-11.0 HR.
NICHIKAWA	SEE AKITA					
MOLODEZHNYAYA	ANTARCTICA	-67.67	45.87	-69.76	85.36	-3.0 HR.
NATAL	BRAZIL	-5.87	324.62	3.87	33.70	+3.0 HR.
NORTON SOUND (SHIP)	VARIOUS OCEANS AND SEAS					
NOUADHIOU	MAURITANIA	20.91	342.99	27.67	56.21	+0.0 HR.
NOYKOV (SHIP)	VARIOUS OCEANS AND SEAS					
OBACHI	JAPAN	40.70	141.73	30.60	206.75	-9.0 HR.
OSTROY KHEYSIA	SEE HEISS ISLAND					
PACIFIC MISSILE RANGE	SEE POINT ARGUELLO					
PERDASOFOGU	SEE SARDINIA					
PLESETSK	U.S.S.R.	65.70	40.35	59.99	129.08	-4.0 HR.



Table 1. List of Launch Sites (concluded)

SITE NAME	SITE LOCATION	GEOGRAPHIC		GEOMAGNETIC		ADD FOR UNIVERSAL TIME
		LAT	E LONG	LAT	E LONG	
PLYMOUTH ROCK (SHIP)	VARIOUS OCEANS AND SEAS					
POINT ARGUELLO	USA/CALIFORNIA	34.62	239.42	41.20	301.03	+8.0 HR.
POINT BARROW	SEE BARROW					
POINT MUGU	USA/CALIFORNIA	34.12	240.88	40.96	302.73	+8.0 HR.
POKER FLAT	SEE FAIRBANKS					
PORT-AUX-FRANCAIS	SEE KERGUELEN ISLAND					
PRILIV (SHIP)	VARIOUS OCEANS AND SEAS					
PRIMROSE LAKE	CANADA/SASKATCHEWAN	54.75	249.95	62.50	304.83	+7.0 HR.
PROFESSOR VIZE (SHIP)	VARIOUS OCEANS AND SEAS					
PUNTA LOBOS	PERU	-12.30	283.32	-0.89	352.69	+5.0 HR.
REGGANE	ALGERIA	26.72	0.17	30.26	75.13	+0.0 HR.
RESOLUTE BAY	CANADA/NORTHWEST TERRITORIES	74.70	265.10	82.99	289.27	+6.0 HR.
RUSHMORE (SHIP)	VARIOUS OCEANS AND SEAS					
SALTO DI QUIRRA	SEE SARDINIA					
SAN MARCO PLATFORM	INDIAN OCEAN	-2.94	40.20	-6.64	108.30	-3.0 HR.
SAN MARCO RANGE	SEE SAN MARCO PLATFORM					
SAN NICOLAS ISLAND	SEE POINT MUGU					
SARDINIA	SARDINIA	39.56	9.24	40.95	87.95	-1.0 HR.
SHIP A	EQUATORIAL PACIFIC	0.18	198.58	-0.31	267.59	+11.0 HR.
SHIP A.I. NOYKOV	SEE NOYKOV (SHIP)					
SHIP B	N ATLANTIC	62.06	296.08	73.49	8.39	+4.0 HR.
SHIP C	CANADA/NORTHWEST TERRITORIES	74.57	265.52	82.97	290.67	+6.0 HR.
SHIP D	N ATLANTIC	54.00	306.67	64.91	21.98	+4.0 HR.
SHIP E	N ATLANTIC	58.43	304.94	69.42	21.03	+4.0 HR.
SHIP F	N ATLANTIC	49.00	311.60	59.54	27.09	+3.0 HR.
SHIP G	N ATLANTIC	57.80	313.30	68.05	32.74	+3.0 HR.
SHIP H	N ATLANTIC	65.60	302.00	76.72	20.06	+4.0 HR.
SHIRSHOV (SHIP)	VARIOUS OCEANS AND SEAS					
SHOKALSKI (SHIP)	VARIOUS OCEANS AND SEAS					
SIPLE STATION	ANTARCTICA	75.92	276.09	85.83	300.58	-6.0 HR.
SONDRE STRØMFJORD	GREENLAND	67.02	309.60	77.40	34.82	+3.0 HR.
SOMMIANI	PAKISTAN	25.20	66.75	16.74	138.75	-5.0 HR.
SOUTH UIST	UNITED KINGDOM	57.37	352.67	61.00	80.17	-1.0 HR.
SRINARIKOTA	INDIA	13.78	80.25	3.84	150.15	-5.5 HR.
SYOWA BASE	ANTARCTICA	-69.00	39.60	-69.66	77.69	-3.0 HR.
SYOWA BAY	SEE SYOWA BASE					
TARTAGUL	ARGENTINA	-22.77	296.18	-11.31	4.87	+4.0 HR.
TERLS	SEE THUMBA					
TEST CENTER OF LANDES	FRANCE	44.27	3.61	46.61	84.11	-1.0 HR.
THULE/CAMP TUTO	GREENLAND	76.55	291.2	88.05	1.37	+4.0 HR.
THUMBA	INDIA	8.33	76.87	-1.22	146.27	-5.5 HR.
TOHOPAH TEST RANGE	USA/NEVADA	38.00	243.50	45.19	304.48	+8.0 HR.
TRIVANDRUM	SEE THUMBA					
TYURATAM	U.S.S.R.	45.63	63.27	37.35	139.39	-5.0 HR.
TYURATAM-BAIKONUR	SEE TYURATAM					
UCHINDURA	SEE KAGOSHIMA					
USS PLYMOUTH ROCK	SEE PLYMOUTH ROCK (SHIP)					
VANDENBURG AFB	SEE POINT ARGUELLO					
VEGA BAJA	SEE ARECIBO					
VICECOMEDORO MARAMPIO	ANTARCTICA	-64.27	303.07	-52.95	8.67	-4.0 HR.
VIZE (SHIP)	SEE PROFESSOR VIZE (SHIP)					
VOLGOGRAD	U.S.S.R.	48.68	44.35	43.14	123.82	-4.0 HR.
VOLNA (SHIP)	VARIOUS OCEANS AND SEAS					
WALKER CAY	BAHAMA ISLANDS	27.00	282.00	38.34	349.76	+5.0 HR.
WALLOPS FLIGHT CENTER	SEE WALLOPS ISLAND					
WALLOPS ISLAND	USA/VIRGINIA	37.83	284.52	49.31	352.12	+5.0 HR.
WEST GEIRINISH	SEE SOUTH UIST					
WESTERN TEST RANGE	SEE POINT ARGUELLO					
WHITE SANDS	USA/NEW MEXICO	32.40	253.47	41.19	316.88	+7.0 HR.
WOOMERA	AUSTRALIA/SOUTHERN AUSTRALIA	-31.97	136.52	-42.18	209.55	-9.5 HR.
YUMA	USA/ARIZONA	32.87	245.68	40.51	308.23	+7.0 HR.

Table 2. Experiment Discipline Codes

1. Aurora and Airglow
  - 1A atmospheric radiations
  - 1B auroral emissions
  - 1C airglow emissions
  - 1D airglow composition
  - 1X subdiscipline unknown
2. Atmospheric Physics
  - 2A winds and diffusion
  - 2B pressure
  - 2C temperature
  - 2D albedo
  - 2E planetary radiations
  - 2F neutral density
  - 2G neutral composition
  - 2H electromagnetic waves
  - 2I acoustics
  - 2J meteorological applications
  - 2K noctilucet clouds
  - 2L absorption/scattering
  - 2X subdiscipline unknown
3. Ionosphere
  - 3A wave propagation
  - 3B currents and fields
  - 3C ion/electron density
  - 3D ion composition
  - 3E ion/electron temperature
  - 3F ion production/recombination
  - 3G ionospheric motions
  - 3X subdiscipline unknown
4. Energetic Particles
  - 4A galactic or solar cosmic rays
  - 4B precipitating particles
  - 4C trapped radiation
  - 4X subdiscipline unknown
5. Magnetic and Electric Fields
  - 5A electric fields
  - 5B magnetic fields
  - 5C other
  - 5X subdiscipline unknown
6. Solar Physics
  - 6A radio ( $> 1$  mm)
  - 6B infrared (0.8-1000 micrometers)
  - 6C visible (3000-8000 Å)
  - 6D ultraviolet (2000-3000 Å)
  - 6E extreme UV (100-2000 Å)
  - 6F X rays (0.001-100 Å)
  - 6G gamma rays ( $< 0.001$  Å)
  - 6X subdiscipline unknown
7. Astronomy
  - 7A radio ( $> 1$  mm)
  - 7B infrared (0.8-1000 micrometers)
  - 7C visible (3000-8000 Å)
  - 7D ultraviolet (2000-3000 Å)
  - 7E extreme UV (100-2000 Å)
  - 7F X rays (0.001-100 Å)
  - 7G gamma rays ( $< 0.001$  Å)
  - 7X subdiscipline unknown
8. Planetology
  - 8A micrometeorites
  - 8B zodiacal light or gegenschein
  - 8C gravity
  - 8D terrain photographs
  - 8X subdiscipline unknown
9. Biology
  - 9X subdiscipline unknown
0. Rocket/Satellite Test and Other
  - 0A performance
  - 0B communication systems
  - 0C experiment test/development
  - 0D engineering experiments
  - 0E other
  - 0X subdiscipline unknown

Table 3. Instrument Codes

AF	accelerometer	AK	photon spectrometer (spectrograph)
AK	air sample	AKCM	Bragg
AD	antenna	AKKQ	interferometer (grating spectrometer)
CA	camera	AKPM	optical monochromator
CRKZ	image tubes (TV)	AKSF	proportional
CAMN	photography	AKUM	scintillator
CX	chaff, needles, crashed parachute	EO	Pitot tube
DC	chemical releases	RV	pressure
DELA	ion cloud	SE	propagation
DEON	neutral cloud	SEBZ	beacon
DEYO	vapor	SESN	radar
GB	dust	SEZA	vlf/elf emissions
LI	electric field meter (electrometer)	SW	radiometer
GY	energy deposition	SWCM	bolometer
GYKZ	ion chamber	SWHU	fixed frequency
GYPC	nuclear emulsions	SWOG	multichannel
HG	exobiology (extraterrestrial life)	SWOZ	nonscanning
HGCF	biological sample	SWRI	photometer
HP	falling sphere	SWRJ	photomultiplier
JE	gravity	SWRD	polarimeter
JH	grenade	SWUE	scanning
XD	hygrometer	SWUV	single frequency
LD	ion trap (probe or retarding potential analyzer)	SWVY	swept frequency
LDDI	cold cathode gage	UT	single element counter
LDMQ	Faraday cup (planar trap)	UTCW	Cerenkov
LDIY	capacitance probe	UTCZ	channeltron (electron multiplier)
LDIZ	Gerdien condenser	UTIG	Geiger tube
LOKF	impedance probe	UTDR	neutron monitor
LDLU	Langmuir probe	UTPC	nuclear emulsions
LDTF	resonance probe	UTSJ	photomultiplier
LQVY	spherical traps	UTSF	proportional
LDMU	suprathermal ion detector	UTUH	scintillator
LG	ionization gauge	UTVP	solid-state detector
LGAZ	alphatron	XG	telescope
LGBY	Bayard-Alpert	XGBD	antenna
LQPH	Deegatron	XP	thermometer
LQTF	redhead (magnetron)	XPCA	bead thermistor
LI	ionosondes (pulsed transmitter, receiver)	ZZ	unknown instrument or instruments
LIHU	fixed frequency		
LIOG	multichannel		
LIMY	swept frequency		
MT	magnetometer		
MTBD	antenna		
MTFZ	fluxgate		
MTSH	proton precession		
MTUJ	search coil		
MTYB	vapor		
MP	meteorological rocketsonde		
MR	micrometeorites		
MX	other instrument or instruments		
ON	multielement counter		
ONCW	Cerenkov		
ONCZ	channeltron (electron multiplier)		
ONIQ	Geiger tube		
ONDR	neutron monitor		
ONPC	nuclear emulsions		
ONSF	proportional		
ONUH	scintillator		
ONVP	solid-state detector		
ONVU	spark chamber		
OO	ozone		
OOAC	absorption		
OOGT	emission		
OOUF	scattering (backscatter or forward scatter)		
OOZU	chemiluminescence		
PX	particle spectrometer (mass spectrometer)		
PXBT	conductance/resistance		
PXFV	double focus		
PXGS	electrostatic analyzer		
PXMR	magnetic		
PXSK	quadrupole radio frequency (mass filter)		
PXST	radio frequency (Bennett tube)		
PXTV	velocity filter (time of flight)		
PXZU	chemiluminescence		

REPORT OF ROCKET LAUNCHING									
SPONSORING (FUNDING) COUNTRY/COUNTRIES FEDERAL REPUBLIC OF GERMANY NORWAY AFDBYA ROCK'ET RANGE									
REPORT DATE YEAR 19 78 MONTH 02 DAY 07									
AGENCY ROCKET IDENTIFICATION T/NL F2D PROJECT NAME OR NUMBER IMS SUBSTORM ROCKET TYPE SKYLARK 12 OTHER ROCKET IDENTIFICATION A-GRC 88									
LAUNCH SITE LAUNCH SITE (SHIP) NAME LAUNCH SITE LATITUDE 69° 17' 39" NORTH <input checked="" type="checkbox"/> SOUTH <input type="checkbox"/> LAUNCH SITE LONGITUDE 16° 01' 19" EAST <input checked="" type="checkbox"/> WEST <input type="checkbox"/> UT LAUNCH DATE AND TIME YEAR 19 78 MONTH 01 DAY 30 HOUR 22 MINUTES 10 LOCAL ZONE LAUNCH TIME DAY 30 HOUR 23 MINUTES 10									
PROJECT SCIENTIST DR K WILHELM AFFILIATION MPAE Lindau, FRG PERFORMANCE <input checked="" type="checkbox"/> SUCCESS <input type="checkbox"/> PARTIAL <input type="checkbox"/> FAILURE PEAK ALTITUDE NM 541 STATUTE MILES									
EXPERIMENTS									
NUMBER	EXPERIMENTER	EXPERIMENTER AFFILIATION	DISCIPLINE*	INSTRUMENT OR OBSERVING TECHNIQUE*					
1	DR B THEILE	TUB, FRG	5B	MTHZ					
2	DR G DERMEL	TUB, FRG	5B	MTUI					
3	DR K WILHELM/ DR W RIEDLER	MPAE Lindau, FRG TUG, AUSTRIA	4B	PKGS					
4	DR W STUDEMANN	MPAE Lindau, FRG	4B	ORVP					
CHECK (✓) IF REQUIRED FOR LAUNCH <input type="checkbox"/> AIRGLOW/AURORA <input checked="" type="checkbox"/> NIGHT <input type="checkbox"/> STRATOCLOUD <input type="checkbox"/> NUCLEIC CLOUD <input type="checkbox"/> NUCLEIC SHOWER <input type="checkbox"/> ECLIPSE <input type="checkbox"/> SUNMAG QUIET <input checked="" type="checkbox"/> OTHER Recovery phase of magnetospheric substorm <input type="checkbox"/> DAWN/DUSK <input type="checkbox"/> ARTIFICIAL EVENT <input type="checkbox"/> SOLAR FLARE <input type="checkbox"/> SPORADIC <input type="checkbox"/> SATELLITE OVERFLY <input type="checkbox"/> SPREAD F <input type="checkbox"/> MAGNETIC STORM <input type="checkbox"/> ACTIVE SUN <input type="checkbox"/> SHD, PCA OR AZA									
PREPARED BY Rolf Bjurström AGENCY Andoya Rocket Range									
REMARKS/RESULTS DORNIER Attitude Control System mounted in the payload.									

Figure 1. Sample Rocket Launching Report

DATE AND TIME OF LAUNCH (UT)	AGENCY ROCKET IDENTIFICATION	SPONSORING COUNTRIES	LAUNCHING SITE	EXPERIMENT DISCIPLINES	INSTRUMENTS	PEAK ALT. (KM)	EXPERIMENTERS OR INSTITUTIONS
74/02/20 1701	C111-001	ESRO SWEDEN SWITZERLAND	KIRUNA	1B 2A 2C 3C 3E 4B 5A	GI LDLU LDVY NX SWQI UTCZ UTVP	155	ESA-ESTEC FANLSON,U.V. KOPP,E.
74/02/20 1807	S10-002	SWEDEN UNITED STATES	KIRUNA	1B 3A 3C 3E 4B 5A	GI LDLU LDVY NX SWQI UTCZ UTVP	235	FANLSON,U.V. HOFFMAN,R.A. HOLBACK,B. LUNDIN,R.
74/02/20 1822	C111-002	ESRO SWEDEN SWITZERLAND	KIRUNA	1B 2A 2C 3C 3E 4B 5A	GI LDLU LDVY NX SWQI UTCZ UTVP	152	ESA-ESTEC FANLSON,U.V. KOPP,E.
74/02/20 1907	S10-001	SWEDEN UNITED STATES	KIRUNA	1B 3A 3C 3E 4B 5A	GI LDLU LDVY NX SWQI UTCZ UTVP	235	FANLSON,U.V. HOFFMAN,R.A. HOLBACK,B. LUNDIN,R.
75/02/25 0135	SL-1301	AUSTRALIA UNITED KINGDOM	WOONERA	6E	CRQH QKQK XG	282	FIRTH,J.G. JONES,B.B. LUDBROOK,G.D. SHENTON,D.B.
75/06/24 1118	SL-1105	AUSTRALIA UNITED KINGDOM	WOONERA	7F	UTSF XG	180	JANES,A.F. POUNDS,K.A. SMITH,A. WATSON,B.
75/11/21 1637	S0 -001	SWEDEN	KIRUNA	0E	NX	131	SWEDISH SPACE CORP.
75/11/24 1515	SL-1112	AUSTRALIA UNITED KINGDOM	WOONERA	7F	UTSF XG	251	GRIFFITHS,R.E. POUNDS,K.A. ROTHENFLUG,R.
76/01/22 1858	S17-001	SWEDEN	KIRUNA	3C 3E 4B 5A	GI LDLU LDVY UTCZ UTVP	208	INSTITUTE OF TECHNOLOGY KIRUNA GEOPHYSICAL INST UPPSALA IONOSPHERIC OBS
*76/01/30 0107	SL-1302	AUSTRALIA UNITED KINGDOM	WOONERA	7F	CR QKCM QKPM	278	BOYD,A.L.F. DAY,M. DAY,M. PARKINSON,J.H.
76/02/21 1942	S18-001	FED REP OF GERMANY NORWAY SWEDEN	KIRUNA	2F 2G 3A 3C 3D 3F 4B	LD LDLU LG PKSK SE UTIQ UTVP	105	RPI-KERNPHYSIK NORWEGIAN DEFENCE RES UPPSALA IONOSPHERIC OBS
76/03/02 2349	S21-001	SWEDEN UNITED KINGDOM	KIRUNA	3G	DCLA DCOM	160	U COLLEGE LONDON UPPSALA IONOSPHERIC OBS
76/03/06 2100	S17-002	SWEDEN	KIRUNA	3C 3E 4B 5A	GI LDLU LDVY UTCZ UTVP	210	INSTITUTE OF TECHNOLOGY KIRUNA GEOPHYSICAL INST UPPSALA IONOSPHERIC OBS
76/03/23 1920	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	98	CENTRAL AEROLOGICAL OBS
76/03/23 2040	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	83	CENTRAL AEROLOGICAL OBS
*76/05/12 1050	SL-1115	AUSTRALIA UNITED KINGDOM	WOONERA	7F	UTSF XG	231	BERTHELSDOFF,R. EVLES,C.J. HOOVER,R. WILLMORE,A.P.
76/05/18 1701	A03.410-01	UNITED STATES	WHITE SANDS	3C 6B	LD QKPM	190	DEBO,D.E. MCMAHON,W.J. SWIRDALUS,R.
76/05/27 0030	SL-1271	AUSTRALIA UNITED KINGDOM	WOONERA	3G 0A 0B	DCYB	254	BEATTIE,D.G.E. HAZELL,F. POTTER,E.A. REES,B.
76/06/10 1740	SL-1212	AUSTRALIA UNITED KINGDOM	WOONERA	7F	QKCM XG	280	BOYD,R.L.F. STARK,J. ZARNECKI,J.C.
76/06/17 0747	SL-1501	AUSTRALIA UNITED KINGDOM	WOONERA	7F	UTSF XG	256	PROCTER,R. SKINNER,G.K. WILLMORE,A.P.
*76/07/17 0610	SL-1402	SPAIN UNITED KINGDOM	EL ARENOSILLO	7F	QKCM UTSF XG	256	BERTHELSDOFF,R. SEUERMANH,K. STAUERT,R.
76/11/04 0745	SL-1306	AUSTRALIA UNITED KINGDOM	WOONERA	7F	UTSF XG	191	GILES,B. POUNDS,K.A. WATSON,B.
*76/12/02 1440	SL-1114	AUSTRALIA UNITED KINGDOM	WOONERA	7D 7E	CRQH QKQK XG	263	HARDCASTLE,R.A. SHENTON,D.B.

\*IDENTIFIES LAUNCHINGS THAT FAILED TO RETURN USEFUL DATA.

DATE AND TIME OF LAUNCH (UT)	AGENCY ROCKET IDENTIFICATION	SPONSORING COUNTRIES	LAUNCHING SITE	EXPERIMENT DISCIPLINES	INSTRUMENTS	PEAK ALT. (KM)	EXPERIMENTERS OR INSTITUTIONS
77/01/15 0050	S18-002	FED REP OF GERMANY NORWAY SWEDEN	KIRUNA	2F 26 3A 3C 3D 3F 4B	LD LDLU LG PKSK SE UTIQ UTVP LDLU PKST QK GI LDLU LDVY NX UTCZ UTVP	104	RPI-KERNPHYSIK NORWEGIAN DEFENCE RES UPPSALA IONOSPHERIC OBS
77/01/27 1935	NR-12	U.S.S.R.	HEISS ISLAND	1B 26 3C 3D 3E	LDLU PKST QK GI LDLU LDVY NX UTCZ UTVP	157	INST OF APPLIED GEOPHYS POLAR GEOPHYSICAL INSTI
77/02/08 1758	S -022	BELGIUM NORWAY SWEDEN	KIRUNA	3C 3E 4B 5A	LDLU LDVY NX UTCZ UTVP	212	INSTITUTE OF TECHNOLOGY KIRUNA GEOPHYSICAL INST UNIVERSITE DE LIEGE UNIVERSITY OF BERGEN UNIVERSITY OF OSLO UNIVERSITY OF STOCKHOLM UPPSALA IONOSPHERIC OBS INST OF APPLIED GEOPHYS POLAR GEOPHYSICAL INSTI
77/02/09 1729	NR-12	U.S.S.R.	HEISS ISLAND	1B 26 3C 3D 3E	LDLU PKST QK **	167	INST OF APPLIED GEOPHYS POLAR GEOPHYSICAL INSTI
77/02/10 0022	S-310JA-02	JAPAN	SYOWA BASE		DCOM LDLU PKST UTCZ	212	INST OF APPLIED GEOPHYS
77/02/10 0315	NR-12	U.S.S.R.	HEISS ISLAND	26 3D 3E 4B	DCOM LDLU PKST UTCZ	152	INST OF EXP METEOROLOGY SSCNR
77/02/13 1219	NR-12	U.S.S.R.	HEISS ISLAND	2A 2C 26 3C 3D 4B	DCOM LDKF PKST UTCZ	151	INST OF APPLIED GEOPHYS INST OF EXP METEOROLOGY SSCNR
77/02/15 1848	S21-002	SWEDEN	KIRUNA	2G	DCOM LDLU PKST UTCZ	166	U COLLEGE LONDON UPPSALA IONOSPHERIC OBS
77/03/06 2331	NR-12	UNITED KINGDOM U.S.S.R.	HEISS ISLAND	2A 2C 26 3C 3D 4B	DCOM LDKF PKST UTCZ	170	INST OF APPLIED GEOPHYS INST OF EXP METEOROLOGY SSCNR
77/03/07 1553	NR-12	U.S.S.R.	HEISS ISLAND	2A 2C	DCOM LDLU PKST UTCZ	170	INST OF EXP METEOROLOGY SSCNR
77/03/13 2131	NR-12	U.S.S.R.	HEISS ISLAND	26 3D 3E 4B	DCOM LDLU PKST UTCZ	163	INST OF APPLIED GEOPHYS INST OF EXP METEOROLOGY SSCNR
77/03/16 2005	NR-12	U.S.S.R.	HEISS ISLAND	2A 2C 26 3C 3D 4B	DCOM LDKF PKST UTCZ	160	INST OF APPLIED GEOPHYS INST OF EXP METEOROLOGY SSCNR
77/03/18 2010	NR-12	U.S.S.R.	HEISS ISLAND	26 3D 3E 4B	DCOM LDLU PKST UTCZ	162	INST OF APPLIED GEOPHYS INST OF EXP METEOROLOGY SSCNR
77/03/28 1906	NR-12	U.S.S.R.	HEISS ISLAND	26 3C 3D 3E 4B	LDKF LDLU PKST UTCZ	155	INST OF APPLIED GEOPHYS INST OF EXP METEOROLOGY SSCNR
77/03/28 2231	NR-12	U.S.S.R.	HEISS ISLAND	26 3C 3D 3E 4B	LDKF LDLU PKST UTCZ	169	INST OF APPLIED GEOPHYS INST OF EXP METEOROLOGY SSCNR
77/03/29 0006	NR-12	U.S.S.R.	HEISS ISLAND	26 3C 3D 3E 4B	LDKF LDLU PKST UTCZ	170	INST OF APPLIED GEOPHYS INST OF EXP METEOROLOGY SSCNR
77/03/29 0216	NR-12	U.S.S.R.	HEISS ISLAND	26 3C 3D 3E 4B	LDKF LDLU PKST UTCZ	168	INST OF APPLIED GEOPHYS INST OF EXP METEOROLOGY SSCNR
77/03/29 0337	NR-12	U.S.S.R.	HEISS ISLAND	26 3C 3D 3E 4B	LDKF LDLU PKST UTCZ	165	INST OF APPLIED GEOPHYS INST OF EXP METEOROLOGY SSCNR
*77/04/28 1225	SL-1115A	AUSTRALIA UNITED KINGDOM	WOOMERA	7F	UTSF XG	244	BERTHELSDOORF, R. EYLES, C.J. WILLMORE, A.P.
77/05/27 1940	N-100	U.S.S.R.	VOLGOGRAD	2J	NP	84	CENTRAL AEROLOGICAL OBS
77/05/27 2045	N-100	U.S.S.R.	VOLGOGRAD	2J	NP	81	CENTRAL AEROLOGICAL OBS
77/06/06 2300	N-100	U.S.S.R.	VOLGOGRAD	2J	NP	84	CENTRAL AEROLOGICAL OBS
77/06/27 1148	P--196H	UNITED KINGDOM	SOUTH UST	26 3C	LDLU QKPN LDNQ LDLU SQOI	129	DICKINSON, P.H.G.
77/06/27 1206	P--190H	UNITED KINGDOM	SOUTH UIST	2B 3C	LDLU QKPN LDNQ LDLU SQOI	124	WILLIAMS, E.R.
77/07/01 1400	N-100	U.S.S.R.	MOLODEZHNYAYA	2J	NP	92	CENTRAL AEROLOGICAL OBS
77/07/06 1400	N-100	U.S.S.R.	MOLODEZHNYAYA	2J	NP	84	CENTRAL AEROLOGICAL OBS
77/07/06 1500	N-100	INDIA	THUMBA	2J	NP	79	CENTRAL AEROLOGICAL OBS
77/07/06 1530	N-100	U.S.S.R.	HEISS ISLAND	2J	NP	82	CENTRAL AEROLOGICAL OBS
77/07/08 1400	N-100	U.S.S.R.	MOLODEZHNYAYA	2J	NP	88	CENTRAL AEROLOGICAL OBS
77/07/13 1400	N-100	U.S.S.R.	HEISS ISLAND	2J	NP	83	CENTRAL AEROLOGICAL OBS
77/07/13 1500	N-100	INDIA	THUMBA	2J	NP	83	CENTRAL AEROLOGICAL OBS
77/07/13 1500	N-100	U.S.S.R.	MOLODEZHNYAYA	2J	NP	90	CENTRAL AEROLOGICAL OBS

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 \*IDENTIFIES LAUNCHINGS THAT FAILED TO RETURN USEFUL DATA.  
 \*\*NO SCIENTIFIC INSTRUMENTS USED.

DATE AND TIME OF LAUNCH (UT)	AGENCY ROCKET IDENTIFICATION	SPONSORING COUNTRIES	LAUNCHING SITE	EXPERIMENT DISCIPLINES	INSTRUMENTS	PEAK ALT. (KM)	EXPERIMENTERS OR INSTITUTIONS
77/07/13 2000	MMR-06	U.S.S.R.	KRENKEL' (SHIP) (53 00N 35 00W)	2J	NP	60	CENTRAL AEROLOGICAL OBS
77/07/15 0900	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	90	CENTRAL AEROLOGICAL OBS
77/07/15 1500	M-100	U.S.S.R.	SHOKALSKI (SHIP) (11 00N 66 00E)	2J	NP	87	CENTRAL AEROLOGICAL OBS
77/07/20 0900	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	86	CENTRAL AEROLOGICAL OBS
77/07/20 1400	M-100	INDIA	THUMBA	2J	NP	84	CENTRAL AEROLOGICAL OBS
77/07/20 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	82	CENTRAL AEROLOGICAL OBS
77/07/20 1800	MMR-06	U.S.S.R.	KRENKEL' (SHIP) (53 00N 35 00W)	2J	NP	62	CENTRAL AEROLOGICAL OBS
77/07/20 2000	MMR-06	U.S.S.R.	KRENKEL' (SHIP) (53 00N 35 00W)	2J	NP	62	CENTRAL AEROLOGICAL OBS
*77/07/21 0900	NASA 25.01666	UNITED STATES	WHITE SANDS	7B 7E	CAKE SWQJ XG	206	BOHLIN, R.C. STECHE, T.P.
77/07/22 1400	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	86	CENTRAL AEROLOGICAL OBS
77/07/27 0400	MMR-06	U.S.S.R.	USHAKOV (SHIP) (36 00N 29 00W)	2J	NP	60	CENTRAL AEROLOGICAL OBS
77/07/27 0900	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	87	CENTRAL AEROLOGICAL OBS
77/07/27 1400	M-100	INDIA	THUMBA	2J	NP	85	CENTRAL AEROLOGICAL OBS
77/07/27 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	83	CENTRAL AEROLOGICAL OBS
77/07/27 1900	MMR-06	U.S.S.R.	KRENKEL' (SHIP) (53 00N 35 00W)	2J	NP	59	CENTRAL AEROLOGICAL OBS
77/07/27 2100	MMR-06	U.S.S.R.	KRENKEL' (SHIP) (53 00N 35 00W)	2J	NP	58	CENTRAL AEROLOGICAL OBS
77/07/29 0900	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	78	CENTRAL AEROLOGICAL OBS
77/07/29 1900	MMR-06	U.S.S.R.	KRENKEL' (SHIP) (53 00N 35 00W)	2J	NP	61	CENTRAL AEROLOGICAL OBS
77/07/29 2000	MMR-06	U.S.S.R.	KRENKEL' (SHIP) (53 00N 35 00W)	2J	NP	60	CENTRAL AEROLOGICAL OBS
77/08/03 0900	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	87	CENTRAL AEROLOGICAL OBS
77/08/03 1030	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	86	CENTRAL AEROLOGICAL OBS
77/08/03 1400	M-100	INDIA	THUMBA	2J	NP	90	CENTRAL AEROLOGICAL OBS
77/08/03 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	82	CENTRAL AEROLOGICAL OBS
77/08/03 2200	MMR-06	U.S.S.R.	USHAKOV (SHIP) (52 00N 35 00W)	2J	NP	60	CENTRAL AEROLOGICAL OBS
77/08/05 0100	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	85	CENTRAL AEROLOGICAL OBS
77/08/05 2100	MMR-06	U.S.S.R.	USHAKOV (SHIP) (52 00N 35 00W)	2J	NP	63	CENTRAL AEROLOGICAL OBS
77/08/10 0700	M-100	INDIA	THUMBA	2J	NP	72	CENTRAL AEROLOGICAL OBS
77/08/10 0900	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	90	CENTRAL AEROLOGICAL OBS
77/08/10 1030	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	81	CENTRAL AEROLOGICAL OBS
77/08/10 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	88	CENTRAL AEROLOGICAL OBS
77/08/10 2100	MMR-06	U.S.S.R.	USHAKOV (SHIP) (52 00N 35 00W)	2J	NP	62	CENTRAL AEROLOGICAL OBS
77/08/12 0900	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	87	CENTRAL AEROLOGICAL OBS
77/08/12 2100	MMR-06	U.S.S.R.	USHAKOV (SHIP) (53 00N 35 00W)	2J	NP	61	CENTRAL AEROLOGICAL OBS
77/08/16 1115	L-03H-009 S-133	JAPAN	KAGOSHIMA	0C 1C 3A 3B 3C 3D 3E 3X 4B 4C 7A 7F	LDF LDLU LIHU LIWY OHUH PXGS PXSK QKKQ QKPM SEZA SWHU SWQJ	1294	FUKADA, Y. HIRAO, K. ITO, T. IWAMOTO, I. KAMADA, T. KANEKO, O. KAWASHIMA, N. KONDO, T. KUBO, H. MAKINO, F. MAKINO, T. MIYATAKE, S. MORIOKA, A. MUKAI, T. MURATA, S. NAKAMURA, M. ONO, T. OYAMA, H. OYAMA, K. SAGAWA, E. SASAKI, S. SEKIGUCHI, H. SUITZ, T. SUZUKI, K. TAKANO, M. WATANABE, T. YAMAMOTO, H.
77/08/17 0900	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	88	CENTRAL AEROLOGICAL OBS
77/08/17 1400	M-100	INDIA	THUMBA	2J	NP	69	CENTRAL AEROLOGICAL OBS
77/08/17 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	83	CENTRAL AEROLOGICAL OBS
77/08/17 1620	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	81	CENTRAL AEROLOGICAL OBS
77/08/17 2100	MMR-06	U.S.S.R.	USHAKOV (SHIP) (53 00N 35 00W)	2J	NP	63	CENTRAL AEROLOGICAL OBS
77/08/19 0900	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	90	CENTRAL AEROLOGICAL OBS
77/08/19 2100	MMR-06	U.S.S.R.	USHAKOV (SHIP) (52 00N 35 00W)	2J	NP	63	CENTRAL AEROLOGICAL OBS
77/08/23 2300	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	84	CENTRAL AEROLOGICAL OBS
77/08/24 1400	M-100	INDIA	THUMBA	2J	NP	88	CENTRAL AEROLOGICAL OBS

\*IDENTIFIES LAUNCHINGS THAT FAILED TO RETURN USEFUL DATA.

DATE AND TIME OF LAUNCH (UT)	AGENCY ROCKET IDENTIFICATION	SPONSORING COUNTRIES	LAUNCHING SITE	EXPERIMENT DISCIPLINES	INSTRUMENTS	PEAK ALT. (KM)	EXPERIMENTERS OR INSTITUTIONS
77/08/24 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	85	CENTRAL AEROLOGICAL OBS
77/08/24 1400	M-100	U.S.S.R.	MOLODEZHNYAYA	2J	NP	91	CENTRAL AEROLOGICAL OBS
77/08/26 1400	M-100	U.S.S.R.	MOLODEZHNYAYA	2J	NP	93	CENTRAL AEROLOGICAL OBS
77/08/26 2100	MHR-06	U.S.S.R.	USHAKOV (SHIP) (52 ODN 35 OOW)	2J	NP	61	CENTRAL AEROLOGICAL OBS
77/08/31 1130	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	85	CENTRAL AEROLOGICAL OBS
77/08/31 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	85	CENTRAL AEROLOGICAL OBS
77/08/31 1400	M-100	U.S.S.R.	MOLODEZHNYAYA	2J	NP	87	CENTRAL AEROLOGICAL OBS
77/08/31 1500	M-100	INDIA	THUMBA	2J	NP	84	CENTRAL AEROLOGICAL OBS
77/08/31 2200	MHR-06	U.S.S.R.	USHAKOV (SHIP) (53 ODN 35 OOW)	2J	NP	61	CENTRAL AEROLOGICAL OBS
77/09/03 1000	K -09M-059 S-134	JAPAN	KAGOSHIMA	1C 2F 3C 3E 6E	GKXZ LDKF LDLU QAC SWQJ UTCZ	376	HIGASHINO,I. HIRAO,K. OBAYASHI,T. OGAWA,T. OSHIO,T. OYAMA,K. SUZUKI,K. TAKEYA,K. TOHMATSU,T. WATANABE,H. WATANABE,T. WATANABE,Y.
77/09/07 0200	MHR-06	U.S.S.R.	USHAKOV (SHIP) (36 ODN 23 OOW)	2J	NP	59	CENTRAL AEROLOGICAL OBS
77/09/07 1400	M-100	INDIA	THUMBA	2J	NP	84	CENTRAL AEROLOGICAL OBS
77/09/07 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	89	CENTRAL AEROLOGICAL OBS
77/09/07 1400	M-100	U.S.S.R.	MOLODEZHNYAYA	2J	NP	85	CENTRAL AEROLOGICAL OBS
77/09/07 1940	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	84	CENTRAL AEROLOGICAL OBS
77/09/13 2130	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	76	CENTRAL AEROLOGICAL OBS
77/09/14 1222	K -010-013 S-135	JAPAN	KAGOSHIMA	7D 7E 7F	OHUH UTSF	204	HAYAKAWA,S. INOUE,H. IWANAMI,H. KOYAMA,K. KUNIEDA,H. MATSUOKA,H. NAGASE,T. TANAKA,Y. TSUNEMI,H. YAMASHITA,K.
77/09/14 1400	M-100	INDIA	THUMBA	2J	NP	67	CENTRAL AEROLOGICAL OBS
77/09/14 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	83	CENTRAL AEROLOGICAL OBS
77/09/14 1400	M-100	U.S.S.R.	MOLODEZHNYAYA	2J	NP	87	CENTRAL AEROLOGICAL OBS
77/09/15 0930	S -210-012 S-136	JAPAN	KAGOSHIMA	1C 2F 3C	LDKF LDLU QAC QKPH	114	MAKINO,T. MATSUOKA,H. OBAYASHI,T. SEKIGUCHI,H. TOHMATSU,T. WATANABE,T. WATANABE,Y. YAMAMOTO,H.
77/09/21 0835	S -310-004 S-137	JAPAN	KAGOSHIMA	3A 3C 3E 3X	LDHQ LDLU LIHU SEZA	188	HASHIMOTO,K. HIRAO,K. KIMURA,I. HAMBO,H. MINAMI,S. NAGANO,I. ODA,H. OYAMA,K. SHIMIZU,K. TAKEYA,Y.
77/09/21 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	83	CENTRAL AEROLOGICAL OBS
77/09/21 1400	M-100	U.S.S.R.	MOLODEZHNYAYA	2J	NP	85	CENTRAL AEROLOGICAL OBS
77/09/21 1700	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	76	CENTRAL AEROLOGICAL OBS
77/09/22 1400	M-100	INDIA	THUMBA	2J	NP	78	CENTRAL AEROLOGICAL OBS
77/09/24 1400	M-100	U.S.S.R.	THUMBA	2J	NP	---	CENTRAL AEROLOGICAL OBS
77/09/28 1400	M-100	U.S.S.R.	MOLODEZHNYAYA	2J	NP	72	CENTRAL AEROLOGICAL OBS
77/09/28 1500	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	87	CENTRAL AEROLOGICAL OBS
77/09/28 1545	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	73	CENTRAL AEROLOGICAL OBS
77/09/29 1400	M-100	INDIA	THUMBA	2J	NP	87	CENTRAL AEROLOGICAL OBS
77/10/04 0220	MHR-12	U.S.S.R.	VOLGOGRAD	2G 3D	PXST	170	CENTRAL AEROLOGICAL OBS
77/10/05 0500	M-100	U.S.S.R.	THUMBA	2J	NP	90	CENTRAL AEROLOGICAL OBS
77/10/05 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	89	CENTRAL AEROLOGICAL OBS
77/10/05 1400	M-100	U.S.S.R.	MOLODEZHNYAYA	2J	NP	88	CENTRAL AEROLOGICAL OBS
77/10/05 1500	M-100	U.S.S.R.	THUMBA	2J	NP	85	CENTRAL AEROLOGICAL OBS
77/10/05 1530	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	73	CENTRAL AEROLOGICAL OBS
77/10/05 1700	M-100	U.S.S.R.	THUMBA	2J	NP	81	CENTRAL AEROLOGICAL OBS
77/10/05 2000	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	94	CENTRAL AEROLOGICAL OBS
77/10/05 2116	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	93	CENTRAL AEROLOGICAL OBS
77/10/08 0200	MHR-06	U.S.S.R.	KRENKEL' (SHIP) (53 ODN 35 OOW)	2J	NP	59	CENTRAL AEROLOGICAL OBS
77/10/08 0400	MHR-06	U.S.S.R.	KRENKEL' (SHIP) (53 ODN 35 OOW)	2J	NP	59	CENTRAL AEROLOGICAL OBS
77/10/11 1400	M-100	U.S.S.R.	THUMBA	2J	NP	82	CENTRAL AEROLOGICAL OBS
77/10/12 1230	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	81	CENTRAL AEROLOGICAL OBS
77/10/12 1345	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	80	CENTRAL AEROLOGICAL OBS



DATE AND TIME OF LAUNCH (UT)	AGENCY ROCKETS IDENTIFICATION	SPONSORING COUNTRIES	LAUNCHING SITE	EXPERIMENT DISCIPLINES	INSTRUMENTS	PEAK ALT. (KM)	EXPERIMENTERS OR INSTITUTIONS
77/10/12 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	89	CENTRAL AEROLOGICAL OBS
77/10/12 1400	M-100	U.S.S.R.	MOLODEZHNYAYA	2J	NP	87	CENTRAL AEROLOGICAL OBS
77/10/13 0200	MHR-06	U.S.S.R.	KRENKEL' (SHIP) (53 00N 35 00W)	2J	NP	36	CENTRAL AEROLOGICAL OBS
77/10/13 2020	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	94	CENTRAL AEROLOGICAL OBS
77/10/15 0200	MHR-06	U.S.S.R.	KRENKEL' (SHIP) (53 00N 35 00W)	2J	NP	57	CENTRAL AEROLOGICAL OBS
77/10/15 0400	MHR-06	U.S.S.R.	KRENKEL' (SHIP) (53 00N 35 00W)	2J	NP	64	CENTRAL AEROLOGICAL OBS
77/10/18 2128	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	93	CENTRAL AEROLOGICAL OBS
77/10/19 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	84	CENTRAL AEROLOGICAL OBS
77/10/19 1400	M-100	U.S.S.R.	THUMBA	2J	NP	82	CENTRAL AEROLOGICAL OBS
77/10/19 1500	M-100	U.S.S.R.	MOLODEZHNYAYA	2J	NP	78	CENTRAL AEROLOGICAL OBS
77/10/19 1645	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	77	CENTRAL AEROLOGICAL OBS
77/10/20 0100	MHR-06	U.S.S.R.	KRENKEL' (SHIP) (53 00N 35 00W)	2J	NP	66	CENTRAL AEROLOGICAL OBS
77/10/20 0300	MHR-06	U.S.S.R.	KRENKEL' (SHIP) (53 00N 35 00W)	2J	NP	65	CENTRAL AEROLOGICAL OBS
77/10/21 0849	S19- B	SWEDEN	KIRUNA	0A	**	374	ANDERSON, L.
77/10/21 1140	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	85	CENTRAL AEROLOGICAL OBS
77/10/21 1240	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	35	CENTRAL AEROLOGICAL OBS
77/10/22 0300	MHR-06	U.S.S.R.	KRENKEL' (SHIP) (53 00N 35 00W)	2J	NP	61	CENTRAL AEROLOGICAL OBS
77/10/25 1120	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	90	CENTRAL AEROLOGICAL OBS
77/10/25 1230	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	87	CENTRAL AEROLOGICAL OBS
77/10/25 1800	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	80	CENTRAL AEROLOGICAL OBS
77/10/26 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	88	CENTRAL AEROLOGICAL OBS
77/10/26 1400	M-100	U.S.S.R.	MOLODEZHNYAYA	2J	NP	86	CENTRAL AEROLOGICAL OBS
77/10/26 1600	M-100	U.S.S.R.	THUMBA	2J	NP	79	CENTRAL AEROLOGICAL OBS
77/10/27 0200	MHR-06	U.S.S.R.	KRENKEL' (SHIP) (53 00N 35 00W)	2J	NP	62	CENTRAL AEROLOGICAL OBS
77/11/02 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	89	CENTRAL AEROLOGICAL OBS
77/11/02 1400	M-100	U.S.S.R.	MOLODEZHNYAYA	2J	NP	89	CENTRAL AEROLOGICAL OBS
77/11/02 1540	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	78	CENTRAL AEROLOGICAL OBS
*77/11/02 1600	M-100	U.S.S.R.	THUMBA	2J	NP	---	CENTRAL AEROLOGICAL OBS
77/11/02 1700	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	81	CENTRAL AEROLOGICAL OBS
77/11/02 1800	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	94	CENTRAL AEROLOGICAL OBS
77/11/05 1500	M-100	U.S.S.R.	KOROLEV (SHIP) (15 00S 95 00E)	2J	NP	82	CENTRAL AEROLOGICAL OBS
77/11/07 2000	M-100	U.S.S.R.	KOROLEV (SHIP) (28 00S 95 00E)	2J	NP	82	CENTRAL AEROLOGICAL OBS
77/11/08 1700	M-100	U.S.S.R.	KOROLEV (SHIP) (30 00S 101 00E)	2J	NP	75	CENTRAL AEROLOGICAL OBS
77/11/09 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	84	CENTRAL AEROLOGICAL OBS
77/11/09 1430	M-100	U.S.S.R.	MOLODEZHNYAYA	2J	NP	89	CENTRAL AEROLOGICAL OBS
77/11/09 1540	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	78	CENTRAL AEROLOGICAL OBS
77/11/09 1700	M-100	U.S.S.R.	MOLODEZHNYAYA	2J	NP	86	CENTRAL AEROLOGICAL OBS
77/11/09 1700	M-100	U.S.S.R.	KOROLEV (SHIP) (30 00S 108 00E)	2J	NP	82	CENTRAL AEROLOGICAL OBS
77/11/09 1900	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	86	CENTRAL AEROLOGICAL OBS
77/11/10 1500	M-100	U.S.S.R.	THUMBA	2J	NP	86	CENTRAL AEROLOGICAL OBS
77/11/11 1700	M-100	U.S.S.R.	KOROLEV (SHIP) (30 00S 108 00E)	2J	NP	86	CENTRAL AEROLOGICAL OBS
77/11/13 1700	M-100	U.S.S.R.	KOROLEV (SHIP) (40 00S 95 00E)	2J	NP	81	CENTRAL AEROLOGICAL OBS
77/11/15 1500	M-100	U.S.S.R.	KOROLEV (SHIP) (50 00S 95 00E)	2J	NP	79	CENTRAL AEROLOGICAL OBS
77/11/16 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	89	CENTRAL AEROLOGICAL OBS
77/11/16 1400	M-100	U.S.S.R.	MOLODEZHNYAYA	2J	NP	87	CENTRAL AEROLOGICAL OBS
77/11/16 1500	M-100	U.S.S.R.	THUMBA	2J	NP	86	CENTRAL AEROLOGICAL OBS
77/11/16 1530	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	76	CENTRAL AEROLOGICAL OBS
77/11/16 1700	M-100	U.S.S.R.	KOROLEV (SHIP) (45 00S 95 00E)	2J	NP	76	CENTRAL AEROLOGICAL OBS
77/11/16 1737	FLIGHT 177 Y 1-8729	UNITED STATES	WALLOPS ISLAND	2G	OUAC	72	WRIGHT, D. U. JR.
*77/11/16 1800	FLIGHT 178 Y1-8718	CANADA UNITED STATES	FORT CHURCHILL	2G	COAR	75	WRIGHT, D. U. JR.
77/11/17 1100	M-100	U.S.S.R.	SHOKALSKI (SHIP) (30 00S 180 00E)	2J	NP	85	CENTRAL AEROLOGICAL OBS
77/11/21 1600	M-100	U.S.S.R.	KOROLEV (SHIP) (30 00S 83 00E)	2J	NP	82	CENTRAL AEROLOGICAL OBS
77/11/22 1500	M-100	U.S.S.R.	THUMBA	2J	NP	82	CENTRAL AEROLOGICAL OBS
77/11/22 1650	M-100	U.S.S.R.	KOROLEV (SHIP) (30 00S 77 00E)	2J	NP	84	CENTRAL AEROLOGICAL OBS
77/11/23 1000	M-100	U.S.S.R.	SHOKALSKI (SHIP) (09 00N 180 00E)	2J	NP	86	CENTRAL AEROLOGICAL OBS
77/11/23 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	82	CENTRAL AEROLOGICAL OBS
77/11/23 1400	M-100	U.S.S.R.	MOLODEZHNYAYA	2J	NP	86	CENTRAL AEROLOGICAL OBS
77/11/23 1500	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	84	CENTRAL AEROLOGICAL OBS
77/11/23 1700	M-100	U.S.S.R.	KOROLEV (SHIP) (30 00S 70 00E)	2J	NP	84	CENTRAL AEROLOGICAL OBS
77/11/24 1200	M-100	U.S.S.R.	SHOKALSKI (SHIP) (06 00N 180 00E)	2J	NP	86	CENTRAL AEROLOGICAL OBS
77/11/24 1800	M-100	U.S.S.R.	KOROLEV (SHIP) (30 00S 65 00E)	2J	NP	88	CENTRAL AEROLOGICAL OBS
77/11/26 1000	M-100	U.S.S.R.	SHOKALSKI (SHIP) (00 00N 180 00E)	2J	NP	74	CENTRAL AEROLOGICAL OBS
77/11/26 1700	M-100	U.S.S.R.	KOROLEV (SHIP) (40 00S 65 00E)	2J	NP	71	CENTRAL AEROLOGICAL OBS
77/11/28 1000	M-100	U.S.S.R.	SHOKALSKI (SHIP) (00 00N 180 00E)	2J	NP	85	CENTRAL AEROLOGICAL OBS
77/11/28 1500	M-100	U.S.S.R.	THUMBA	2J	NP	85	CENTRAL AEROLOGICAL OBS

\* IDENTIFIES LAUNCHINGS THAT FAILED TO RETURN USEFUL DATA.  
 \*\* NO SCIENTIFIC INSTRUMENTS USED.

DATE AND TIME OF LAUNCH (UT)	AGENCY ROCKET IDENTIFICATION	SPONSORING COUNTRIES	LAUNCHING SITE	EXPERIMENT DISCIPLINES	INSTRUMENTS	PEAK ALT. (KM)	EXPERIMENTERS OR INSTITUTIONS
77/11/28 1700	M-100	U.S.S.R.	KOROLEV (SHIP) (48 OOS 65 OOE)	2J	NP	77	CENTRAL AEROLOGICAL OBS
77/11/28 1800	M-100	U.S.S.R.	KOROLEV (SHIP) (48 OOS 65 OOE)	2J	NP	70	CENTRAL AEROLOGICAL OBS
77/11/29 1000	M-100	U.S.S.R.	SHOKALSKI (SHIP) (09 OON 179 OOE)	2J	NP	85	CENTRAL AEROLOGICAL OBS
77/11/29 1700	M-100	U.S.S.R.	KOROLEV (SHIP) (44 OOS 66 OOE)	2J	NP	79	CENTRAL AEROLOGICAL OBS
77/11/29 1900	M-100	U.S.S.R.	KOROLEV (SHIP) (44 OOS 66 OOE)	2J	NP	82	CENTRAL AEROLOGICAL OBS
77/11/30 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	79	CENTRAL AEROLOGICAL OBS
77/11/30 1400	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	85	CENTRAL AEROLOGICAL OBS
77/11/30 1500	M-100	U.S.S.R.	VOLGOGRA	2J	NP	82	CENTRAL AEROLOGICAL OBS
77/11/30 1600	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	87	CENTRAL AEROLOGICAL OBS
77/11/30 1600	M-100	U.S.S.R.	KOROLEV (SHIP) (40 OOS 66 OOE)	2J	NP	85	CENTRAL AEROLOGICAL OBS
77/12/01 0900	M-100	U.S.S.R.	VOLGOGRA	2J	NP	104	CENTRAL AEROLOGICAL OBS
77/12/01 1800	M-100	U.S.S.R.	KOROLEV (SHIP) (35 OOS 65 OOE)	2J	NP	84	CENTRAL AEROLOGICAL OBS
77/12/02 0200	MMR-06	U.S.S.R.	MUSSON (SHIP) (53 OON 35 OOW)	2J	NP	66	CENTRAL AEROLOGICAL OBS
77/12/02 1100	M-100	U.S.S.R.	SHOKALSKI (SHIP) (20 OOS 180 OOE)	2J	NP	88	CENTRAL AEROLOGICAL OBS
77/12/02 2100	M-100	U.S.S.R.	KOROLEV (SHIP) (30 OOS 65 OOE)	2J	NP	82	CENTRAL AEROLOGICAL OBS
77/12/03 1900	M-100	U.S.S.R.	KOROLEV (SHIP) (25 OOS 61 OOE)	2J	NP	85	CENTRAL AEROLOGICAL OBS
77/12/06 0000	AMF-H5B-003	CANADA	CAPE PARRY	1B 3C 3G 5A 5B 6B	BD LD MT OH PX QK QKKQ SWQ1	300	HARRIS, F.R. HIRAO, K. KOEHLER, J.A. KOEHLER, R.A. LLEVELLYN, E.J. MCEWEN, D.J. MCHAMARA, A.G. SHEPHERD, G.G. WHALEN, B.A.
77/12/07 0200	MMR-06	U.S.S.R.	MUSSON (SHIP) (53 OON 35 OOW)	2J	NP	65	CENTRAL AEROLOGICAL OBS
77/12/07 1400	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	90	CENTRAL AEROLOGICAL OBS
77/12/07 1500	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	81	CENTRAL AEROLOGICAL OBS
77/12/07 1500	M-100	U.S.S.R.	VOLGOGRA	2J	NP	79	CENTRAL AEROLOGICAL OBS
77/12/09 1800	M-100	U.S.S.R.	KOROLEV (SHIP) (25 OOS 61 OOE)	2J	NP	85	CENTRAL AEROLOGICAL OBS
77/12/10 1000	M-100	U.S.S.R.	SHOKALSKI (SHIP) (30 OOS 180 OOE)	2J	NP	83	CENTRAL AEROLOGICAL OBS
77/12/11 0600	NASA 24.060GG	UNITED STATES	WHITE SANDS	7D 7E	CRKE SWQJ UTCZ CRKE SWQJ	177	SMITH, A.M.
77/12/11 0745	NASA 25.017GG	UNITED STATES	WHITE SANDS	7D 7E	CRKE SWQJ XG	226	STECHER, T.P.
77/12/11 1630	NASA 18.183GA	UNITED STATES	WHITE SANDS	6C 6D 6E	MT QKPM SWQJ NP	196	GUENTHER, D.W.
77/12/11 1700	M-100	U.S.S.R.	KOROLEV (SHIP) (25 OOS 61 OOE)	2J	NP	82	CENTRAL AEROLOGICAL OBS
77/12/12 2300	AMF-H5D-004	CANADA	CAPE PARRY	1B 3C 3G 5A 5B 6B	BD LD MT OH PX QK QKKQ SWQ1	---	HARRIS, F.R. HIRAO, K. KOEHLER, J.A. KOEHLER, R.A. LLEVELLYN, E.J. MCEWEN, D.J. MCHAMARA, A.G. SHEPHERD, G.G. WHALEN, B.A.
77/12/14 0200	MMR-06	U.S.S.R.	MUSSON (SHIP) (53 OON 35 OOW)	2J	NP	56	CENTRAL AEROLOGICAL OBS
77/12/14 0900	M-100	U.S.S.R.	VOLGOGRA	2J	NP	78	CENTRAL AEROLOGICAL OBS
77/12/14 1200	M-100	U.S.S.R.	SHOKALSKI (SHIP) (30 OOS 180 OOE)	2J	NP	80	CENTRAL AEROLOGICAL OBS
77/12/14 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	87	CENTRAL AEROLOGICAL OBS
77/12/14 1600	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	86	CENTRAL AEROLOGICAL OBS
77/12/14 1700	M-100	U.S.S.R.	VOLGOGRA	2J	NP	84	CENTRAL AEROLOGICAL OBS
*77/12/14 1712	FLIGHT 179 T 1-8730	UNITED STATES	WALLOPS ISLAND	2G	OOAC	56	WRIGHT, D.U., JR.
77/12/14 1800	M-100	U.S.S.R.	VOLGOGRA	2J	NP	86	CENTRAL AEROLOGICAL OBS
77/12/15 1600	M-100	U.S.S.R.	KOROLEV (SHIP) (25 OOS 61 OOE)	2J	NP	83	CENTRAL AEROLOGICAL OBS
77/12/15 1656	FLIGHT 180 T 1-8731	UNITED STATES	WALLOPS ISLAND	2G	OOAC	67	WRIGHT, D.U., JR.
77/12/16 1700	M-100	U.S.S.R.	KOROLEV (SHIP) (25 OOS 61 OOE)	2J	NP	85	CENTRAL AEROLOGICAL OBS
77/12/16 1800	FLIGHT 181 TH1-8719	CANADA UNITED STATES	FORT CHURCHILL	2G	OOAC	75	WRIGHT, D.U., JR.
77/12/18 1100	M-100	U.S.S.R.	SHOKALSKI (SHIP) (40 OOS 179 OOE)	2J	NP	80	CENTRAL AEROLOGICAL OBS
77/12/19 1700	M-100	U.S.S.R.	KOROLEV (SHIP) (25 OOS 61 OOE)	2J	NP	85	CENTRAL AEROLOGICAL OBS
77/12/20 1700	M-100	U.S.S.R.	KOROLEV (SHIP) (25 OOS 61 OOE)	2J	NP	87	CENTRAL AEROLOGICAL OBS

\*IDENTIFIES LAUNCHINGS THAT FAILED TO RETURN USEFUL DATA.

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OF POOR QUALITY

DATE AND TIME OF LAUNCH (UT)	AGENCY ROCKET IDENTIFICATION	SPONSORING COUNTRIES	LAUNCHING SITE	EXPERIMENT DISCIPLINES	INSTRUMENTS	PEAK ALT. (KM)	EXPERIMENTERS OR INSTITUTIONS
77/12/21 0200	MHR-06	U.S.S.R.	MUSSON (SHIP) (53 00N 35 00W)	2J	NP	66	CENTRAL AEROLOGICAL OBS
77/12/21 0920	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	80	CENTRAL AEROLOGICAL OBS
77/12/21 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	78	CENTRAL AEROLOGICAL OBS
77/12/21 1400	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	89	CENTRAL AEROLOGICAL OBS
77/12/21 1630	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	81	CENTRAL AEROLOGICAL OBS
77/12/21 1700	M-100	U.S.S.R.	KOROLEV (SHIP) (25 00S 61 00E)	2J	NP	85	CENTRAL AEROLOGICAL OBS
77/12/22 1600	M-100	U.S.S.R.	KOROLEV (SHIP) (25 00S 61 00E)	2J	NP	87	CENTRAL AEROLOGICAL OBS
77/12/26 1500	M-100	U.S.S.R.	SHOKALSKI (SHIP) (40 00S 160 00E)	2J	NP	84	CENTRAL AEROLOGICAL OBS
77/12/27 0400	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	80	CENTRAL AEROLOGICAL OBS
77/12/27 0740	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	90	CENTRAL AEROLOGICAL OBS
77/12/27 2117	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	88	CENTRAL AEROLOGICAL OBS
77/12/27 2300	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	88	CENTRAL AEROLOGICAL OBS
77/12/28 0300	MHR-06	U.S.S.R.	MUSSON (SHIP) (53 00N 35 00W)	2J	NP	59	CENTRAL AEROLOGICAL OBS
77/12/28 1030	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	83	CENTRAL AEROLOGICAL OBS
77/12/28 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	85	CENTRAL AEROLOGICAL OBS
77/12/28 1400	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	87	CENTRAL AEROLOGICAL OBS
77/12/28 1700	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	88	CENTRAL AEROLOGICAL OBS
77/12/29 1340	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	88	CENTRAL AEROLOGICAL OBS
77/12/29 1500	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	87	CENTRAL AEROLOGICAL OBS
77/12/29 1620	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	88	CENTRAL AEROLOGICAL OBS
77/12/29 1740	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	90	CENTRAL AEROLOGICAL OBS
78/01/04 0930	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	90	CENTRAL AEROLOGICAL OBS
78/01/04 1400	M-100	INDIA	THUMBA	2J	NP	86	CENTRAL AEROLOGICAL OBS
78/01/04 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	79	CENTRAL AEROLOGICAL OBS
78/01/04 1500	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	87	CENTRAL AEROLOGICAL OBS
78/01/05 1500	M-100	U.S.S.R.	SHOKALSKI (SHIP) (11 00S 159 00E)	2J	NP	82	CENTRAL AEROLOGICAL OBS
78/01/09 2000	NASA 25.029GA	UNITED STATES	WHITE SANDS	1C 1D	OK SWQJ	262	GENTILE, C.P.
*78/01/10 0615	NASA 25.012UH	UNITED STATES	WHITE SANDS	7F	CRQH UTCZ XG NP	196	MURRAY, S.S.
78/01/10 1200	M-100	U.S.S.R.	SHOKALSKI (SHIP) (04 00S 160 00E)	2J	NP	81	CENTRAL AEROLOGICAL OBS
78/01/11 1015	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	89	CENTRAL AEROLOGICAL OBS
78/01/11 1200	M-100	U.S.S.R.	KOROLEV (SHIP) (41 00N 160 00E)	2J	NP	90	CENTRAL AEROLOGICAL OBS
78/01/11 1400	M-100	INDIA	THUMBA	2J	NP	86	CENTRAL AEROLOGICAL OBS
78/01/11 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	84	CENTRAL AEROLOGICAL OBS
78/01/11 1500	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	87	CENTRAL AEROLOGICAL OBS
78/01/12 0820	M-100	U.S.S.R.	KOROLEV (SHIP) (40 00N 165 00E)	2J	NP	84	CENTRAL AEROLOGICAL OBS
78/01/12 1300	M-100	U.S.S.R.	SHOKALSKI (SHIP) (00 00N 160 00E)	2J	NP	84	CENTRAL AEROLOGICAL OBS
78/01/13 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	84	CENTRAL AEROLOGICAL OBS
78/01/14 1400	M-100	U.S.S.R.	SHOKALSKI (SHIP) (00 00N 160 00E)	2J	NP	82	CENTRAL AEROLOGICAL OBS
78/01/16 1400	M-100	U.S.S.R.	SHOKALSKI (SHIP) (00 00N 160 00E)	2J	NP	84	CENTRAL AEROLOGICAL OBS
78/01/18 1100	M-100	U.S.S.R.	KOROLEV (SHIP) (10 00N 165 00E)	2J	NP	81	CENTRAL AEROLOGICAL OBS
78/01/18 1200	M-100	U.S.S.R.	SHOKALSKI (SHIP) (04 00N 160 00E)	2J	NP	82	CENTRAL AEROLOGICAL OBS
78/01/18 1255	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	84	CENTRAL AEROLOGICAL OBS
*78/01/18 1400	M-100	INDIA	THUMBA	2J	NP	86	CENTRAL AEROLOGICAL OBS
78/01/18 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	80	CENTRAL AEROLOGICAL OBS
78/01/18 1400	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	86	CENTRAL AEROLOGICAL OBS
78/01/18 1500	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	80	CENTRAL AEROLOGICAL OBS
78/01/18 1708	FLIGHT 182 T 1-8732	UNITED STATES	WALLOPS ISLAND	2G	OOAC	72	WRIGHT, D.U., JR.
*78/01/18 1804	FLIGHT 183 TH1-8720	CANADA UNITED STATES	FORT CHURCHILL	2G	OOAC	74	WRIGHT, D.U., JR.
78/01/20 1000	M-100	U.S.S.R.	SHOKALSKI (SHIP) (10 00N 160 00E)	2J	NP	85	CENTRAL AEROLOGICAL OBS
78/01/20 1145	M-100	U.S.S.R.	SHOKALSKI (SHIP) (10 00N 160 00E)	2J	NP	85	CENTRAL AEROLOGICAL OBS
78/01/21 0901	A31-603	UNITED STATES	WHITE SANDS	3C	LD	258	COHEN, H.A.
78/01/22 0200	K -09M-062 S-138	JAPAN	KAGOSHIMA	3B 3C 3E 5D 6D	GI LD LDKF LDLU MTNZ OK	369	ADYAMA, I. EJIRI, M. HIRAO, K. KOHNO, T. MORI, H. OBAYASHI, T. OYAMA, K. TOHYAMA, F. WATANABE, Y. YAJIMA, N.
78/01/23 1200	M-100	U.S.S.R.	SHOKALSKI (SHIP) (19 00N 160 00E)	2J	NP	86	CENTRAL AEROLOGICAL OBS
78/01/25 1030	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	80	CENTRAL AEROLOGICAL OBS
78/01/25 1400	M-100	INDIA	THUMBA	2J	NP	82	CENTRAL AEROLOGICAL OBS
78/01/25 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	78	CENTRAL AEROLOGICAL OBS
78/01/25 1500	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	88	CENTRAL AEROLOGICAL OBS

\*IDENTIFIES LAUNCHINGS THAT FAILED TO RETURN USEFUL DATA.

DATE AND TIME OF LAUNCH (UT)	AGENCY ROCKL IDENTIFICATION	SPONSORING COUNTRY	LAUNCHING SITE	EXPERIMENT DISCIPLINES	INSTRUMENTS	PEAK ALT. (KM)	EXPERIMENTERS OR INSTITUTIONS
78/01/26 1200	M-100	U.S.S.R.	SHOKALSKI (SHIP) (28 ODN 160 ODE)	2J	NP	84	CENTRAL AEROLOGICAL OBS
78/01/26 1500	M-100	U.S.S.R.	SHOKALSKI (SHIP) (28 ODN 160 ODE)	2J	NP	83	CENTRAL AEROLOGICAL OBS
78/01/27 1100	K-09M-061 S-139	JAPAN	KAGOSHIMA	1C 2G 3A 3E 3X 4X	LDLU LINV OHC7 PXMR QKPM SEZA SWVY NP	292	FUJISAWA,Y. KANADA,T. KANAKO,O. KAWASHIMA,H. KAYA,H. MATSUMOTO,H. ONO,T. SASAKI,S. CENTRAL AEROLOGICAL OBS
78/01/27 1200	M-100	U.S.S.R.	KOROLEV (SHIP) (30 ODS 165 ODE)	2J	NP	90	CENTRAL AEROLOGICAL OBS
78/01/30 1400	M-100	U.S.S.R.	NEISS ISLAND	2J	NP	80	CENTRAL AEROLOGICAL OBS
78/01/30 2052	NASA 18.2111E NASA 18.2111E	NORWAY UNITED KINGDOM UNITED STATES	ANDOYA	0A 0C 1B 3C 4D 5A 5B	GI LDLU L1KY MT MTBD MTHZ MTUI OHCZ OHVP PXGS XGSD GI LD MTHZ MTUI OHVP PXGS	201	HOLTEY,J.A. KELLEY,M. MATTHEWS,D.L. RYCROFT,M.J.
78/01/30 2137	A-GRC -086 T/NL FAC	AUSTRIA FED REP OF GERMANY NORWAY	ANDOYA	3C 3E 4B 4C 5A 5B	GI LD MTHZ MTUI OHVP PXGS	540	DEMHEL,G. FISCHER,H. GRABOWSKI,R. PEDERSEN,A. RIEDLER,W.W. SPENNER,K. STUEMANN,V. THEILE,B. WILHELM,K. DEMHEL,G. FISCHER,H. GRABOWSKI,R. PEDERSEN,A. RIEDLER,W.W. SPENNER,K. STUEMANN,V. THEILE,B. WILHELM,K. DAVIS,J.M.
78/01/30 2210	A-GRC -088 T/NL FAC	AUSTRIA FED REP OF GERMANY NORWAY	ANDOYA	3C 3E 4B 4C 5A 5B	GI LD MTHZ MTUI OHVP PXGS	541	DEMHEL,G. FISCHER,H. GRABOWSKI,R. PEDERSEN,A. RIEDLER,W.W. SPENNER,K. STUEMANN,V. THEILE,B. WILHELM,K. DAVIS,J.M.
78/01/31 1835	NASA 27.029CS	UNITED STATES	WHITE SANDS	6A 6F	CRKE CRQH QKCM XG NP	273	CENTRAL AEROLOGICAL OBS
78/02/01 0200	M-100	U.S.S.R.	KOROLEV (SHIP) (49 ODS 163 ODE)	2J	NP	81	CENTRAL AEROLOGICAL OBS
78/02/01 0200	MNR-06	U.S.S.R.	USHAKOV (SHIP) (53 ODN 35 OOW)	2J	NP	61	CENTRAL AEROLOGICAL OBS
78/02/01 0930	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	85	CENTRAL AEROLOGICAL OBS
78/02/01 1400	M-100	INDIA	THUMDA	2J	NP	82	CENTRAL AEROLOGICAL OBS
78/02/01 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	82	CENTRAL AEROLOGICAL OBS
78/02/01 1500	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	---	CENTRAL AEROLOGICAL OBS
78/02/02 0854	NASA 29.008UE	UNITED STATES	FAIRBANKS	1B	PXGS UICZ	616	EVANS,D.S. MOORE,T. SCHERB,T. DFVLR
78/02/02 1110	A-OR -90 ORION 1	FED REP OF GERMANY NORWAY	ANDOYA	0A	AF MT	57	DICKINSON,P.H.G.
78/02/02 1304	P--199H	UNITED KINGDOM	SOUTH UIST	2G 3C	LDLU QKPM	140	DICKINSON,P.H.G.
78/02/02 1333	P--203H	FED REP OF GERMANY UNITED KINGDOM	SOUTH UIST	2B 3C 3D	LD12 LG PXSK GYK2 LDHQ LOLU	112	KRANKOWSKY,D.K.H.
78/02/02 1356	P--112H	UNITED KINGDOM	SOUTH UIST	3C 6E	PXSK GYK2 LDHQ LOLU	135	WILLIAMS,E.R.
78/02/03 0300	MNR-06	U.S.S.R.	USHAKOV (SHIP) (55 ODN 35 OOW)	2J	NP	61	CENTRAL AEROLOGICAL OBS
78/02/03 1000	M-100	U.S.S.R.	KOROLEV (SHIP) (49 ODS 177 ODE)	2J	NP	82	CENTRAL AEROLOGICAL OBS
78/02/03 1430	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	81	CENTRAL AEROLOGICAL OBS
*78/02/04 0820	NASA 26.063UH	UNITED STATES	WHITE SANDS	7F	CR MT UTSF LDLU UTQJ LDHQ LDLU LD17 LG PXSK LDLU QKPM NP	29	KRAUSHAAR,W.L.
78/02/04 0020	P--200H	UNITED KINGDOM	SOUTH UIST	1C 3C	LDLU UTQJ LDHQ LDLU LD17 LG PXSK LDLU QKPM NP	136	DICKINSON,P.H.G.
78/02/06 0100	P--202H	UNITED KINGDOM	SOUTH UIST	2B 3C	LDLU UTQJ LDHQ LDLU LD17 LG PXSK LDLU QKPM NP	125	WILLIAMS,E.R.
78/02/07 0030	P--204H	UNITED KINGDOM	SOUTH UIST	2B 3C 3D	LDLU UTQJ LDHQ LDLU LD17 LG PXSK LDLU QKPM NP	108	KRANKOWSKY,D.K.H.
78/02/07 0101	P--198H	UNITED KINGDOM	SOUTH UIST	2G 3C	LDLU UTQJ LDHQ LDLU LD17 LG PXSK LDLU QKPM NP	139	DICKINSON,P.H.G.
78/02/07 0900	M-100	U.S.S.R.	KOROLEV (SHIP) (10 ODS 177 OOW)	2J	NP	82	CENTRAL AEROLOGICAL OBS

\*IDENTIFIES LAUNCHINGS THAT FAILED TO RETURN USEFUL DATA.

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DATE AND TIME OF LAUNCH (UT)	AGENCY ROCKET IDENTIFICATION	SPONSORING COUNTRIES	LAUNCHING SITE	EXPERIMENT DISCIPLINES	INSTRUMENTS	PEAK ALT. (KM)	EXPERIMENTERS OR INSTITUTIONS
78/02/08 0300	MNR-06	U.S.S.R.	USHAKOV (SHIP) (53 00N 36 00W)	2J	NP	64	CENTRAL AEROLOGICAL OBS
78/02/08 0423	ARF-6 -006	CANADA	FORT CHURCHILL	3G	SESH	95	FORSYTH, P.A.
78/02/08 1010	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	85	CENTRAL AEROLOGICAL OBS
78/02/08 1400	M-100	INDIA	THUMBA	2J	NP	83	CENTRAL AEROLOGICAL OBS
78/02/08 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	83	CENTRAL AEROLOGICAL OBS
78/02/08 1400	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	91	CENTRAL AEROLOGICAL OBS
78/02/10 0200	MNR-06	U.S.S.R.	USHAKOV (SHIP) (53 00N 35 00W)	2J	NP	62	CENTRAL AEROLOGICAL OBS
78/02/10 0530	NASA 21.056UG	UNITED STATES	WHITE SANDS	7E	CRKE QKKQ XG	238	DAVIDSEN, A. FASTIE, W.G.
78/02/10 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	84	CENTRAL AEROLOGICAL OBS
78/02/13 1215	NASA 21.0420S	UNITED STATES	WHITE SANDS	6E	CRKE CRQH QK XG	210	BRUECKNER, G.E.
78/02/15 0400	MNR-06	U.S.S.R.	USHAKOV (SHIP) (53 00N 35 00W)	2J	NP	69	CENTRAL AEROLOGICAL OBS
78/02/15 0800	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	85	CENTRAL AEROLOGICAL OBS
78/02/15 0900	M-100	U.S.S.R.	KOROLEV (SHIP) (00 00N 180 00E)	2J	NP	84	CENTRAL AEROLOGICAL OBS
78/02/15 1110	MNR-06	U.S.S.R.	VOLGOGRAD	2J	NP	64	CENTRAL AEROLOGICAL OBS
78/02/15 1400	M-100	INDIA	THUMBA	2J	NP	81	CENTRAL AEROLOGICAL OBS
78/02/15 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	83	CENTRAL AEROLOGICAL OBS
78/02/15 1400	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	88	CENTRAL AEROLOGICAL OBS
78/02/15 1703	FLIGHT 184 1 1-2734	UNITED STATES	WALLOPS ISLAND	2G	ODAC	70	WRIGHT, D.U., JR.
78/02/15 1803	FLIGHT 185 TH1-9298	CANADA	FORT CHURCHILL	2G	ODAC	74	WRIGHT, D.U., JR.
78/02/17 0300	MNR-06	U.S.S.R.	USHAKOV (SHIP) (53 00N 35 00W)	2J	NP	65	CENTRAL AEROLOGICAL OBS
78/02/17 0900	M-100	U.S.S.R.	KOROLEV (SHIP) (00 00N 170 00E)	2J	NP	84	CENTRAL AEROLOGICAL OBS
78/02/17 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	81	CENTRAL AEROLOGICAL OBS
78/02/19 0920	M-100	U.S.S.R.	KOROLEV (SHIP) (00 00N 165 00E)	2J	NP	81	CENTRAL AEROLOGICAL OBS
78/02/21 1120	MNR-06	U.S.S.R.	VOLGOGRAD	2J	NP	87	CENTRAL AEROLOGICAL OBS
78/02/22 0200	MNR-06	U.S.S.R.	USHAKOV (SHIP) (53 00N 35 00W)	2J	NP	68	CENTRAL AEROLOGICAL OBS
78/02/22 0900	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	89	CENTRAL AEROLOGICAL OBS
78/02/22 1050	MNR-06	U.S.S.R.	VOLGOGRAD	2J	NP	69	CENTRAL AEROLOGICAL OBS
78/02/22 1210	MNR-06	U.S.S.R.	VOLGOGRAD	2J	NP	91	CENTRAL AEROLOGICAL OBS
78/02/22 1400	M-100	INDIA	THUMBA	2J	NP	85	CENTRAL AEROLOGICAL OBS
78/02/22 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	82	CENTRAL AEROLOGICAL OBS
78/02/23 0830	M-100	U.S.S.R.	KOROLEV (SHIP) (00 00N 178 00E)	2J	NP	88	CENTRAL AEROLOGICAL OBS
78/02/24 0335	MNR-06	U.S.S.R.	USHAKOV (SHIP) (53 00N 35 00W)	2J	NP	64	CENTRAL AEROLOGICAL OBS
78/02/24 0930	M-100	U.S.S.R.	KOROLEV (SHIP) (00 00N 170 00W)	2J	NP	85	CENTRAL AEROLOGICAL OBS
78/02/24 1030	MNR-06	U.S.S.R.	VOLGOGRAD	2J	NP	88	CENTRAL AEROLOGICAL OBS
78/02/24 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	82	CENTRAL AEROLOGICAL OBS
78/02/26 1100	K -09M-060	JAPAN	KAGOSHIMA	7D 7E 7F	QKSF SWQJ UTSF UTUH	340	HAYAKAWA, S. INOUE, H. ITO, K. IWAGAMI, H. KOYAMA, K. KUMIEDA, H. MATSUOKA, M. NAGASE, F. TANAKA, Y. TSUNEMI, H. YAMASHITA, K.
78/02/27 0530	AAF-40-035	CANADA	FORT CHURCHILL	1B 3C 3G	LD PK	700	KOEHLER, J.A. MCNAMARA, A.G. WHALEN, D.A.
78/02/27 0532	AKF-6 -014	CANADA	FORT CHURCHILL	1B	UTUH	55	VENKATESAN, D.
78/02/27 0800	M-100	U.S.S.R.	KOROLEV (SHIP) (00 00N 160 00W)	2J	NP	81	CENTRAL AEROLOGICAL OBS
78/02/28 0309	AKF-6 -015	CANADA	FORT CHURCHILL	1B	OHUH	57	VENKATESAN, D.
78/02/28 0811	1C819.008-01	UNITED STATES	FAIRBANKS	1D 3B 5D	BD LD LDIY LDKF LDLU MT OHUH PXGS SWQI CRKE NT QKKQ	460	ULWICK, J.C.
78/02/28 1752	NASA 13.136DA	UNITED STATES	WHITE SANDS	1C	CRKE NT QKKQ	223	CARRUTHERS, G.R.

DATE AND TIME OF LAUNCH (UT)	AGENCY ROCKET IDENTIFICATION	SPONSORING COUNTRIES	LAUNCHING SITE	EXPERIMENT DISCIPLINES	INSTRUMENTS	PEAK ALT. (KM)	EXPERIMENTERS OR INSTITUTIONS
78/03/01 0113	FERDINAND-047	AUSTRIA FED REP OF GERMANY NORWAY	ANDOYA	0A 2F 2G 2J 3A 3C 4D 6F	LD12 MTHZ OH1Q OHUH OHVP PX5K SE	128	FRIEDRICH, M. STADNES, J. THRANE, E. V. VON ZAHN, U.
78/03/01 0113	FERDINAND-048	AUSTRIA FED REP OF GERMANY NORWAY	ANDOYA	0A 2F 2G 2J 3A 3C 3D	LD12 LG MTHZ PX5K SE	109	ARNOLD, F. FRIEDRICH, M. KRANKOVSKY, D. K. H. THRANE, E. V.
78/03/01 0730	M-100	U.S.S.R.	KOROLEV (SHIP) (10 00N 160 00W)	2J	NP	87	CENTRAL AEROLOGICAL OBS
78/03/01 1330	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	80	CENTRAL AEROLOGICAL OBS
78/03/01 1400	M-100	INDIA U.S.S.R.	THUMBA	2J	NP	83	CENTRAL AEROLOGICAL OBS
78/03/01 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	84	CENTRAL AEROLOGICAL OBS
78/03/01 1400	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	82	CENTRAL AEROLOGICAL OBS
78/03/01 1500	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	79	CENTRAL AEROLOGICAL OBS
78/03/03 1150	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	86	CENTRAL AEROLOGICAL OBS
78/03/03 1330	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	82	CENTRAL AEROLOGICAL OBS
78/03/03 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	80	CENTRAL AEROLOGICAL OBS
78/03/05 0900	M-100	U.S.S.R.	KOROLEV (SHIP) (40 00N 160 00W)	2J	NP	91	CENTRAL AEROLOGICAL OBS
78/03/05 1015	M-100	U.S.S.R.	KOROLEV (SHIP) (40 00N 160 00W)	2J	NP	83	CENTRAL AEROLOGICAL OBS
78/03/07 0700	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	80	CENTRAL AEROLOGICAL OBS
78/03/07 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	85	CENTRAL AEROLOGICAL OBS
78/03/07 1400	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	88	CENTRAL AEROLOGICAL OBS
78/03/08 0400	NASA 25.023UH	UNITED STATES	WHITE SANDS	7F	CRKE UTSF XG	100	RAPPAPORT, S.
78/03/08 0740	M-100	U.S.S.R.	KOROLEV (SHIP) (50 00N 160 00W)	2J	NP	89	CENTRAL AEROLOGICAL OBS
78/03/08 0910	M-100	U.S.S.R.	KOROLEV (SHIP) (50 00N 161 00W)	2J	NP	83	CENTRAL AEROLOGICAL OBS
78/03/08 1400	M-100	INDIA U.S.S.R.	THUMBA	2J	NP	84	CENTRAL AEROLOGICAL OBS
78/03/09 0813	NASA 29.007UE	UNITED STATES	FAIRBANKS	1B 3B 3C	LDLU MT PXGS QK XGBD	336	ANDERSON, H. R.
78/03/10 1540	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	68	CENTRAL AEROLOGICAL OBS
78/03/13 0705	NASA 25.031UE	CANADA UNITED STATES	FORT CHURCHILL	1D	LDLU PX QK SWQJ NP	198	SHARP, W. E. WINNINGHAM, J. D. ZIPF, E. C., JR.
78/03/15 1400	M-100	INDIA U.S.S.R.	THUMBA	2J	NP	83	CENTRAL AEROLOGICAL OBS
78/03/15 1600	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	83	CENTRAL AEROLOGICAL OBS
78/03/15 1714	FLIGHT 187 T 1-8735	UNITED STATES	WALLOPS ISLAND	2G	00AC	76	WRIGHT, D. U., JR.
78/03/15 1900	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	82	CENTRAL AEROLOGICAL OBS
78/03/16 1400	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	80	CENTRAL AEROLOGICAL OBS
78/03/17 0700	MMR-06	U.S.S.R.	MUSSON (SHIP) (53 00N 35 00W)	2J	NP	59	CENTRAL AEROLOGICAL OBS
78/03/17 0800	MMR-06	U.S.S.R.	MUSSON (SHIP) (53 00N 35 00W)	2J	NP	64	CENTRAL AEROLOGICAL OBS
78/03/19 0900	MMR-06	U.S.S.R.	VOLNA (SHIP) (16 00N 150 00W)	2J	NP	59	CENTRAL AEROLOGICAL OBS
78/03/19 1300	M-100	U.S.S.R.	SHIRSHOV (SHIP) (30 00S 178 00E)	2J	NP	88	CENTRAL AEROLOGICAL OBS
78/03/21 0700	MMR-06	U.S.S.R.	VOLNA (SHIP) (24 00N 150 00W)	2J	NP	60	CENTRAL AEROLOGICAL OBS
78/03/22 1350	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	89	CENTRAL AEROLOGICAL OBS
78/03/22 1400	M-100	INDIA U.S.S.R.	THUMBA	2J	NP	---	CENTRAL AEROLOGICAL OBS
78/03/22 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	70	CENTRAL AEROLOGICAL OBS
78/03/22 1400	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	89	CENTRAL AEROLOGICAL OBS
78/03/22 1600	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	88	CENTRAL AEROLOGICAL OBS
78/03/22 1801	FLIGHT 186 TH1-9299	CANADA UNITED STATES	FORT CHURCHILL	2G	00AC	74	WRIGHT, D. U., JR.
78/03/22 1835	FLIGHT 188 TH1-9300	CANADA UNITED STATES	FORT CHURCHILL	2G	00AC	67	WRIGHT, D. U., JR.
78/03/24 0800	MMR-06	U.S.S.R.	VOLNA (SHIP) (34 00N 150 00W)	2J	NP	60	CENTRAL AEROLOGICAL OBS
78/03/26 0700	MMR-06	U.S.S.R.	VOLNA (SHIP) (40 00N 150 00W)	2J	NP	60	CENTRAL AEROLOGICAL OBS
78/03/26 1100	M-100	U.S.S.R.	SHIRSHOV (SHIP) (02 00N 179 00E)	2J	NP	92	CENTRAL AEROLOGICAL OBS
78/03/26 1300	M-100	U.S.S.R.	SHIRSHOV (SHIP) (02 00N 179 00E)	2J	NP	87	CENTRAL AEROLOGICAL OBS
78/03/27 1027	NASA 18.215GM	UNITED STATES	FAIRBANKS	1A 1D	MT OHUH UT1Q XG	219	GOLDBERG, R. A. JONES, W. H.
78/03/29 0700	MMR-06	U.S.S.R.	MUSSON (SHIP) (53 00N 35 00W)	2J	NP	61	CENTRAL AEROLOGICAL OBS

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DATE AND TIME OF LAUNCH (UT)	AGENCY ROCKET IDENTIFICATION	SPONSORING COUNTRIES	LAUNCHING SITE	EXPERIMENT DISCIPLINES	INSTRUMENTS	PEAK ALT. (KM)	EXPERIMENTERS OR INSTITUTIONS
78/03/29 0800	MMN-06	U.S.S.R.	MUSSON (SHIP) (53 00N 35 00W)	2J	NP	62	CENTRAL AEROLOGICAL OBS
78/03/29 1400	M-100	INDIA	THUMBA	2J	NP	---	CENTRAL AEROLOGICAL OBS
78/03/29 1400	M-100	U.S.S.R.	MOLODEZHNAJA	2J	NP	77	CENTRAL AEROLOGICAL OBS
78/03/29 1400	M-100	U.S.S.R.	VOLGOGRADE	2J	NP	86	CENTRAL AEROLOGICAL OBS
78/03/29 1420	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	85	CENTRAL AEROLOGICAL OBS
78/03/29 1500	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	87	CENTRAL AEROLOGICAL OBS
78/03/29 1650	NASA 18.214GM	UNITED STATES	FAIRBANKS	1A 1B	MT OMUH UT10 XG NP	231	GOLDBERG, R.A. JONES, W.H.
78/03/30 1300	M-100	U.S.S.R.	SHIRSHOV (SHIP) (00 00N 160 00E)	2J	NP	88	CENTRAL AEROLOGICAL OBS
78/03/30 1400	M-100	U.S.S.R.	SHIRSHOV (SHIP) (02 00N 160 00E)	2J	NP	83	CENTRAL AEROLOGICAL OBS
78/03/31 0800	MMR-06	U.S.S.R.	MUSSON (SHIP) (53 00N 35 00W)	2J	NP	62	CENTRAL AEROLOGICAL OBS
78/03/31 1410	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	85	CENTRAL AEROLOGICAL OBS
78/03/31 1700	M-100	U.S.S.R.	VOLGOGRADE	2J	NP	90	CENTRAL AEROLOGICAL OBS
78/04/01 1600	MMR-06	U.S.S.R.	USHAKOV (SHIP) (43 00N 031 00E)	2J	NP	59	CENTRAL AEROLOGICAL OBS
78/04/01 1700	MMR-06	U.S.S.R.	USHAKOV (SHIP) (43 00N 031 00E)	2J	NP	58	CENTRAL AEROLOGICAL OBS
78/04/03 1200	M-100	U.S.S.R.	KOROLEV (SHIP) (02 00N 179 00E)	2J	NP	88	CENTRAL AEROLOGICAL OBS
78/04/03 1400	M-100	U.S.S.R.	KOROLEV (SHIP) (02 00N 179 00E)	2J	NP	85	CENTRAL AEROLOGICAL OBS
*78/04/05 1158	A11.712-03	UNITED STATES	KERGUELEN ISLAND	2F	HP	26	PHILBRICK, C.R.
78/04/05 1226	A11.712-04	UNITED STATES	KERGUELEN ISLAND	2F	HP	175	PHILBRICK, C.R.
78/04/05 1400	M-100	U.S.S.R.	MOLODEZHNAJA	2J	NP	85	CENTRAL AEROLOGICAL OBS
78/04/05 1500	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	---	CENTRAL AEROLOGICAL OBS
78/04/05 1930	M-100	U.S.S.R.	VOLGOGRADE	2J	NP	85	CENTRAL AEROLOGICAL OBS
78/04/06 1100	M-100	U.S.S.R.	KOROLEV (SHIP) (31 00N 170 00W)	2J	NP	83	CENTRAL AEROLOGICAL OBS
78/04/07 1100	M-100	U.S.S.R.	KOROLEV (SHIP) (00 00N 165 00W)	2J	NP	87	CENTRAL AEROLOGICAL OBS
78/04/07 1230	M-100	U.S.S.R.	KOROLEV (SHIP) (00 00N 165 00W)	2J	NP	85	CENTRAL AEROLOGICAL OBS
78/04/07 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	83	CENTRAL AEROLOGICAL OBS
78/04/07 1630	M-100	U.S.S.R.	VOLGOGRADE	2J	NP	87	CENTRAL AEROLOGICAL OBS
78/04/09 0450	NASA 27.010AE	CANADA UNITED STATES	FORT CHURCHILL	1B 5A 5B	AF MTBD SWQJ XGBD	247	BERNSTEIN, W. COHEN, H.A. KELLOGG, P.J. KOONS, H.C. WHALEN, B.A. WILHELM, K.
78/04/09 0700	MMR-06	U.S.S.R.	MUSSON (SHIP) (31 00N 030 00W)	2J	NP	61	CENTRAL AEROLOGICAL OBS
78/04/11 0400	NASA 27.026UH	UNITED STATES	WHITE SANDS	7E 7F	QK	303	BOWYER, C.S.
78/04/12 0143	ADD-5A-049 T 1-8736	CANADA SWEDEN	FORT CHURCHILL	1B 1C 1D 3G	XG GY LD QK	140	EVANS, W.E.J. KOEHLER, J.A. LLEWELLYN, E.J. MCNAMARA, A.G. WITT, G.
78/04/12 0700	MMR-06	U.S.S.R.	MUSSON (SHIP) (18 00N 030 00W)	2J	NP	59	CENTRAL AEROLOGICAL OBS
78/04/12 0800	MMR-06	U.S.S.R.	MUSSON (SHIP) (18 00N 030 00W)	2J	NP	60	CENTRAL AEROLOGICAL OBS
78/04/12 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	82	CENTRAL AEROLOGICAL OBS
78/04/12 1400	M-100	U.S.S.R.	MOLODEZHNAJA	2J	NP	86	CENTRAL AEROLOGICAL OBS
78/04/12 1620	M-100	U.S.S.R.	VOLGOGRADE	2J	NP	85	CENTRAL AEROLOGICAL OBS
78/04/12 1700	FLIGHT 189 T 1-8736	UNITED STATES	WHITE SANDS	2G	ODAC	72	WRIGHT, D. U., JR.
78/04/15 0800	MMR-06	U.S.S.R.	MUSSON (SHIP) (05 00N 030 00W)	2J	NP	58	CENTRAL AEROLOGICAL OBS
*78/04/18 1918	AAF-6 -013	CANADA	FORT CHURCHILL	8A	NR	75	WLOCHOWICZ, R.
78/04/19 0400	M-100	U.S.S.R.	VOLGOGRADE	2J	NP	93	CENTRAL AEROLOGICAL OBS
78/04/19 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	83	CENTRAL AEROLOGICAL OBS
78/04/19 1600	M-100	U.S.S.R.	MOLODEZHNAJA	2J	NP	85	CENTRAL AEROLOGICAL OBS
78/04/20 1700	M-100	INDIA	THUMBA	2J	NP	80	CENTRAL AEROLOGICAL OBS
78/04/21 1000	M-100	U.S.S.R.	KOROLEV (SHIP) (35 00N 160 00W)	2J	NP	84	CENTRAL AEROLOGICAL OBS
78/04/22 0835	M-100	U.S.S.R.	KOROLEV (SHIP) (39 00N 160 00W)	2J	NP	88	CENTRAL AEROLOGICAL OBS
78/04/22 1000	M-100	U.S.S.R.	KOROLEV (SHIP) (39 00N 160 00W)	2J	NP	88	CENTRAL AEROLOGICAL OBS
78/04/23 0920	M-100	U.S.S.R.	KOROLEV (SHIP) (40 00N 165 00W)	2J	NP	83	CENTRAL AEROLOGICAL OBS
78/04/24 0850	M-100	U.S.S.R.	KOROLEV (SHIP) (40 00N 170 00W)	2J	NP	87	CENTRAL AEROLOGICAL OBS
78/04/25 0850	M-100	U.S.S.R.	KOROLEV (SHIP) (44 00N 170 00W)	2J	NP	84	CENTRAL AEROLOGICAL OBS
78/04/26 0430	M-100	U.S.S.R.	VOLGOGRADE	2J	NP	84	CENTRAL AEROLOGICAL OBS
78/04/26 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	81	CENTRAL AEROLOGICAL OBS

\*IDENTIFIES LAUNCHINGS THAT FAILED TO RETURN USEFUL DATA.

DATE AND TIME OF LAUNCH (UT)	AGENCY ROCKET IDENTIFICATION	SPONSORING COUNTRIES	LAUNCHING SITE	EXPERIMENT DISCIPLINES	INSTRUMENTS	PEAK ALT. (KM)	EXPERIMENTERS OR INSTITUTIONS
78/04/26 1400	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	86	CENTRAL AEROLOGICAL OBS
78/04/26 1900	M-100	U.S.S.R.	KOROLEV (SHIP)	2J	NP	81	CENTRAL AEROLOGICAL OBS
78/04/27 0900	M-100	U.S.S.R.	(44 00N 170 00W) KOROLEV (SHIP)	2J	NP	81	CENTRAL AEROLOGICAL OBS
78/04/28 1900	FLIGHT 190 TH1-9301	CANADA UNITED STATES	FORT CHURCHILL	2G	00AC	73	WRIGHT,D.U.,JR.
78/05/03 0400	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	78	CENTRAL AEROLOGICAL OBS
78/05/03 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	81	CENTRAL AEROLOGICAL OBS
78/05/03 1400	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	87	CENTRAL AEROLOGICAL OBS
78/05/06 0700	NASA 13.137UH	UNITED STATES	WHITE SANDS	7F	MT UTSF	200	KRAUSHAAR,W.L.
78/05/10 0400	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	54	CENTRAL AEROLOGICAL OBS
78/05/10 0530	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	62	CENTRAL AEROLOGICAL OBS
78/05/10 1400	M-100	INDIA	THUMBA	2J	NP	81	CENTRAL AEROLOGICAL OBS
78/05/10 1417	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	85	CENTRAL AEROLOGICAL OBS
78/05/10 1500	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	85	CENTRAL AEROLOGICAL OBS
78/05/12 0501	SL-1305	AUSTRALIA UNITED KINGDOM	WOOMERA	6E	CRQH UICZ XG	283	GABRIEL,A.H. HARDCASTLE,R.A. STRONG,K.
78/05/15 0905	NASA 25.02600	UNITED STATES	WHITE SANDS	7E	CRKE QKKR	211	CARRUTHERS,G.R.
78/05/15 1400	M-100	INDIA	THUMBA	2J	NP	75	CENTRAL AEROLOGICAL OBS
78/05/16 1833	M-1000	U.S.S.R.	VOLGOGRAD	2G	00ZU	79	CENTRAL AEROLOGICAL OBS
78/05/16 2030	A04.606-01	UNITED STATES	WHITE SANDS	1C 3C 6E	PXGS QKKQ SWQ1	191	HEROUX,L.J. MCMAHON,W.J. VAN TASSEL,R.A.
78/05/17 0400	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	87	CENTRAL AEROLOGICAL OBS
78/05/17 1400	M-100	INDIA	THUMBA	2J	NP	82	CENTRAL AEROLOGICAL OBS
78/05/17 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	77	CENTRAL AEROLOGICAL OBS
78/05/17 1503	T 1-9409	UNITED STATES	WHITE SANDS	2G	00ZU	71	BOLLARMAN,B.
78/05/17 1515	T 1-9410	UNITED STATES	WHITE SANDS	2G	00ZU	71	BOLLARMAN,B.
78/05/17 1702	FLIGHT 191 T 1-8737	UNITED STATES	WHITE SANDS	2G	00AC	71	WRIGHT,D.U.,JR.
78/05/17 1843	T 1-9411	UNITED STATES	WHITE SANDS	2G	00ZU	70	BOLLARMAN,B.
78/05/17 1905	T 1-9412	UNITED STATES	WHITE SANDS	2G	00ZU	67	BOLLARMAN,B.
78/05/17 1948	T 1-9413	UNITED STATES	WHITE SANDS	2G	00ZU	72	BOLLARMAN,B.
78/05/17 2000	T 1-9414	UNITED STATES	WHITE SANDS	2G	00ZU	66	BOLLARMAN,B.
78/05/17 2105	M-1000	U.S.S.R.	VOLGOGRAD	2G	00ZU	81	CENTRAL AEROLOGICAL OBS
78/05/18 1400	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	88	CENTRAL AEROLOGICAL OBS
78/05/19 1400	M-100	INDIA	THUMBA	2J	NP	81	CENTRAL AEROLOGICAL OBS
78/05/20 0929	A45.709-01	UNITED STATES	WALLOPS ISLAND	2A	DC	53	QUESADA,A.F.
78/05/22 0927	A45.709-02	UNITED STATES	WALLOPS ISLAND	2A	DC	54	QUESADA,A.F.
78/05/23 1400	M-100	INDIA	THUMBA	2J	NP	81	CENTRAL AEROLOGICAL OBS
78/05/23 2018	M-1000	U.S.S.R.	VOLGOGRAD	2G	00ZU	78	CENTRAL AEROLOGICAL OBS
78/05/24 0400	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	82	CENTRAL AEROLOGICAL OBS
78/05/24 0510	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	67	CENTRAL AEROLOGICAL OBS
78/05/24 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	77	CENTRAL AEROLOGICAL OBS
78/05/24 1400	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	85	CENTRAL AEROLOGICAL OBS
78/05/24 1800	FLIGHT 192 TH1-9302	CANADA UNITED STATES	FORT CHURCHILL	2G	00AC	71	WRIGHT,D.U.,JR.
78/05/24 2132	M-1000	U.S.S.R.	VOLGOGRAD	2G	00ZU	80	CENTRAL AEROLOGICAL OBS
78/05/26 0000	M-100	U.S.S.R.	VOLGOGRAD	2K	NR	88	CENTRAL AEROLOGICAL OBS
78/05/26 0100	M-100	U.S.S.R.	VOLGOGRAD	2K	NR	82	CENTRAL AEROLOGICAL OBS
78/05/29 1400	M-100	INDIA	THUMBA	2J	NP	81	CENTRAL AEROLOGICAL OBS
78/05/30 2130	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	80	CENTRAL AEROLOGICAL OBS
78/05/31 1400	M-100	INDIA	THUMBA	2J	NP	81	CENTRAL AEROLOGICAL OBS
78/05/31 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	79	CENTRAL AEROLOGICAL OBS
78/05/31 1400	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	85	CENTRAL AEROLOGICAL OBS
78/06/02 1400	M-100	INDIA	THUMBA	2J	NP	84	CENTRAL AEROLOGICAL OBS
78/06/07 0000	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	76	CENTRAL AEROLOGICAL OBS
78/06/07 0900	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	68	CENTRAL AEROLOGICAL OBS
78/06/07 1400	M-100	INDIA	THUMBA	2J	NP	82	CENTRAL AEROLOGICAL OBS
78/06/07 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	87	CENTRAL AEROLOGICAL OBS
78/06/07 1506	M-100	FRANCE	KERGUELEN ISLAND	2J	NP	89	CENTRAL AEROLOGICAL OBS
78/06/09 1400	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	90	CENTRAL AEROLOGICAL OBS
78/06/13 2240	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	89	CENTRAL AEROLOGICAL OBS
78/06/14 1400	M-100	INDIA	THUMBA	2J	NP	78	CENTRAL AEROLOGICAL OBS
78/06/14 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	83	CENTRAL AEROLOGICAL OBS
78/06/14 1400	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	88	CENTRAL AEROLOGICAL OBS
78/06/14 1506	M-100	FRANCE	KERGUELEN ISLAND	2J	NP	87	CENTRAL AEROLOGICAL OBS
78/06/14 1711	FLIGHT 193 T 1-9308	UNITED STATES	WHITE SANDS	2G	00AC	71	WRIGHT,D.U.,JR.
78/06/14 1806	FLIGHT 194 TH1-9303	CANADA UNITED STATES	FORT CHURCHILL	2G	00AC	73	WRIGHT,D.U.,JR.
78/06/16 1400	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	87	CENTRAL AEROLOGICAL OBS
78/06/20 2100	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	87	CENTRAL AEROLOGICAL OBS
78/06/21 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	85	CENTRAL AEROLOGICAL OBS
78/06/21 1400	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	89	CENTRAL AEROLOGICAL OBS

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DATE AND TIME OF LAUNCH (UT)	AGENCY ROCKET IDENTIFICATION	SPONSORING COUNTRIES	LAUNCHING SITE	EXPERIMENT DISCIPLINES	INSTRUMENTS	PEAK ALT. (KM)	EXPERIMENTERS OR INSTITUTIONS
78/06/21 1545	MNR-06	U.S.S.R.	VOLGOGRAD	2L	ODAC SWQJ NP	65	CENTR *ROLOGICAL OBS
78/06/21 1613	M-100	FRANCE U.S.S.R.	KERGUELEN ISLAND	2J	NP	91	CENTRAL AEROLOGICAL OBS
78/06/21 1720	M-100	U.S.S.R.	VOLGOGRAD	2L	ODAC SWQJ NP	84	CENTRAL AEROLOGICAL OBS
78/06/22 1400	M-100	INDIA U.S.S.R.	THUMBA	2J	NP	84	CENTRAL AEROLOGICAL OBS
78/06/23 1400	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	89	CENTRAL AEROLOGICAL OBS
78/06/27 2105	M-100	U.S.S.R.	VOLGOGRAD	2J	NP	85	CENTRAL AEROLOGICAL OBS
78/06/28 1400	M-100	INDIA U.S.S.R.	THUMBA	2J	NP	83	CENTRAL AEROLOGICAL OBS
78/06/28 1400	M-100	U.S.S.R.	HEISS ISLAND	2J	NP	78	CENTRAL AEROLOGICAL OBS
78/06/28 1400	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	86	CENTRAL AEROLOGICAL OBS
78/06/28 1440	M-100	U.S.S.R.	VOLGOGRAD	2X	OD	77	CENTRAL AEROLOGICAL OBS
78/06/28 1545	MNR-06	U.S.S.R.	VOLGOGRAD	2L	ODAC SWQJ NP	66	CENTRAL AEROLOGICAL OBS
78/06/28 1725	M-100	FRANCE U.S.S.R.	KERGUELEN ISLAND	2J	NP	85	CENTRAL AEROLOGICAL OBS
78/06/30 1400	M-100	U.S.S.R.	MOLODEZHNYA	2J	NP	84	CENTRAL AEROLOGICAL OBS
78/07/12 1.04	FLIGHT 195 T 1-9309	UNITED STATES	WALLOPS ISLAND	2G	ODAC	74	WRIGHT,D.U.,JR.
78/07/12 1836	FLIGHT 196 TH1-9304	UNITED STATES	FORT CHURCHILL	2G	ODAC	73	WRIGHT,D.U.,JR.
78/07/20 0430	NASA 25.037UH	UNITED STATES	WHITE SANDS	7F	CRQH UT XG	190	MURRAY,S.S.
78/07/25 0405	A03.604	UNITED STATES	WHITE SANDS	2F	LI ODUF	144	BEDO,D.E.
78/08/13 0058	P--206K	SWEDEN UNITED KINGDOM	KIRUNA	2G 3C 5B	LDLU MTHZ QKPM	150	CHAMPION,K.S.W. DICKINSON,P.H.G.
*78/08/14 1445	NASA 27.034DS	UNITED STATES	WHITE SANDS	6E	CRQH QK XG	220	BRUECKNER,G.E.
*78/08/16 1707	FLIGHT 197 T 1-9310	UNITED STATES	WALLOPS ISLAND	2G	ODAC	68	WRIGHT,D.U.,JR.
78/08/16 1729	FLIGHT 198 T 1-9320	UNITED STATES	WALLOPS ISLAND	2G	ODAC	74	WRIGHT,D.U.,JR.
78/08/16 1816	FLIGHT 199 TH1-9305	CANADA UNITED STATES	FORT CHURCHILL	2G	ODAC	69	WRIGHT,D.U.,JR.
78/08/20 1130	K -09M-064 S-142	JAPAN	KAGOSHIMA	0E 7B 7D 7E 7F 7G	QKSF QKUH SWCH SWQI SWQJ UTIQ	319	FUKADA,Y. HAYAKAWA,S. ITO,K. KONDO,I. HATSUI,Y. MATSUMOTO,T. NOGUCHI,A. TANAKA,Y. YAMASHITA,K.
78/08/23 1734	FLIGHT 200 T 1-9311	UNITED STATES	WALLOPS ISLAND	2G	ODAC	64	WRIGHT,D.U.,JR.
78/08/23 1703	FLIGHT 201 T 1-9312	UNITED STATES	WALLOPS ISLAND	2G	ODAC	64	WRIGHT,D.U.,JR.
78/08/31 1304	FLIGHT 202 T 1-9313	UNITED STATES	WALLOPS ISLAND	2G	ODAC	61	WRIGHT,D.U.,JR.
78/08/31 1708	FLIGHT 203 T 1-9314	UNITED STATES	WALLOPS ISLAND	2G	ODAC	63	WRIGHT,D.U.,JR.
78/09/13 0053	A45.709-01	CANADA UNITED STATES	FORT CHURCHILL	2A	DC	45	QUESADA,A.F.
78/09/13 1113	A45.709-02	CANADA UNITED STATES	FORT CHURCHILL	2A	DC	43	QUESADA,A.F.
78/09/15 2100	A08.708-01	UNITED STATES	WHITE SANDS	3C 3D	LD1Z PXSK	114	BAILEY,A. CONLEY,T.C. NARCISI,R.S.
78/09/19 1830	A04.711-01	UNITED STATES	WHITE SANDS	6D 6E	QKKQ SWQI QKKQ XG	192	BEDO,D.E.
78/09/20 0258	NASA 25.028UL	UNITED STATES	WHITE SANDS	7E	ODAC	224	BARTH,C.A.
78/09/20 1314	FLIGHT 204 T 1-9315	UNITED STATES	WALLOPS ISLAND	2G	ODAC	57	WRIGHT,D.U.,JR.
78/09/20 1732	FLIGHT 205 T 1-9316	UNITED STATES	WALLOPS ISLAND	2G	ODAC	64	WRIGHT,D.U.,JR.
78/09/20 1800	FLIGHT 206 TH1-9306	CANADA UNITED STATES	FORT CHURCHILL	2G	ODAC PX	60	WRIGHT,D.U.,JR.
78/09/20 2030	FLIGHT 207 T 1-9317	UNITED STATES	WALLOPS ISLAND	2G	ODAC	63	WRIGHT,D.U.,JR.
78/09/26 0505	NASA 25.042GG	UNITED STATES	WHITE SANDS	7D 7E	CR XG	231	STECHER,T.P.
*78/10/18 1721	FLIGHT 208 T 1-9318	UNITED STATES	WALLOPS ISLAND	2G	ODAC	---	WRIGHT,D.U.,JR.
78/10/18 1752	FLIGHT 209 T 1-9321	UNITED STATES	WALLOPS ISLAND	2G	ODAC	64	WRIGHT,D.U.,JR.
78/10/26 0916	1C807.015-01	UNITED STATES	FAIRBANKS	1B	SWOG SWQI	122	BURT,D.A. ULWICK,J.C.
*78/10/26 0920	1C806.035-01	UNITED STATES	FAIRBANKS	2A	DC	---	VICKERY,W.K.

\*IDENTIFIES LAUNCHINGS THAT FAILED TO RETURN USEFUL DATA.

DATE AND TIME OF LAUNCH (UT)	AGENCY ROCKET IDENTIFICATION	SPONSORING COUNTRIES	LAUNCHING SITE	EXPERIMENT DISCIPLINES	INSTRUMENTS	PEAK ALT. (KM)	EXPERIMENTERS OR INSTITUTIONS
78/10/26 0929	1A807.057-01	UNITED STATES	FAIRBANKS	1D	AK GI OKUH PA SVQ1 CRKE GI PX QK QKKQ SVQ0 UT PX SVQJ AF OD OCYQ LDLU HTDD NTHZ OMCZ OHIO PAGS SEZA UTIQ ZZ	160	HOWLETT,C. ULWICK,J.C.
78/10/29 0502	EX851.044-01	UNITED STATES	FAIRBANKS	1X	SVQ1 CRKE GI PX QK QKKQ SVQ0 UT PX SVQJ AF OD OCYQ LDLU HTDD NTHZ OMCZ OHIO PAGS SEZA UTIQ ZZ	137	OROWN,H. BURY,D.A. FRODSHAM,G. KEMP,J. O'NEIL,K.N. SHEPARD,O.
78/11/03 0120	NASA 13.135UE	UNITED STATES	WHITE SANDS	1D	SVQJ AF OD OCYQ LDLU HTDD NTHZ OMCZ OHIO PAGS SEZA UTIQ ZZ	151	SHARP,W.E.
78/11/10 0414	SL-1424	NORWAY UNITED KINGDOM	ANDØYA	0A 0E 1D 2A 3A 3C 3E 4D 5A 5B	AF OD OCYQ LDLU HTDD NTHZ OMCZ OHIO PAGS SEZA UTIQ ZZ	802	BRITISH AEROSPACE DRYANT,D.A. MAENLUM,D.N. REES,D. WOOLLISCROFT,L.J.C.
78/11/13 1244	1C830.009-01A	UNITED STATES	FAIRBANKS	1D	QKKQ SVQ1	141	BURY,D.A. STEED,A. ULWICK,J.C.
78/11/16 1815	NASA 13.138GS	UNITED STATES	WHITE SANDS	6D 6C 6D	QKPM SV	182	ASSAF,S. DUNCAN,C.H. GUENTHER,B.W. FASTIE,W.G. GARMIRE,G.P.
78/12/01 0720	NASA 25.038UL	UNITED STATES	WHITE SANDS	7E	XG	238	
78/12/11 0300	NASA 25.001UH	UNITED STATES	WHITE SANDS	7F	CI XI	164	

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### Experimenters

This listing gives (in alphabetical order) the names of the experimenters associated with the sounding rocket launchings. The current organizational affiliation and address of the person is also given. Because NSSDC/WDC-A-R&S does not acquire experiment data from these launchings, please contact the experimenters for further information about these data.

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## ARTIFICIAL EARTH SATELLITES AND SPACE PROBES

The summary of satellite and space probe launchings that follows was compiled from information received from several sources. Primary sources of information were contained in the national launching announcements and the reports of satellite and space probe launchings. These were submitted to the International Ursigram and World Days Service and to the World Data Centers in accordance with the revised "COSPAR Guide to Rocket and Satellite Information and Data Exchange" adopted at the XVth Plenary Meeting of COSPAR, Madrid, May 1972 (COSPAR Transactions No. 8); the former version was published as Part I of COSPAR Transactions No. 4 in December 1967. These announcements and reports are published every month in the SPACEWARN Bulletin. Additional information was obtained from the Table of Artificial Earth Satellites, published by the Royal Aircraft Establishment, Farnborough, Hants, England. Requests for information on the availability of the bulletin should be directed to:

iuwds World Warning Agency for Satellites  
World Data Center A for Rockets and Satellites  
Goddard Space Flight Center  
Code 601  
Greenbelt, Maryland 20771  
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A report on the U.S. scientific satellite GOES 2 is shown in Figure 2. This sample illustrates the type of information in these reports. More detailed narrative descriptions are submitted to COSPAR and published in COSPAR Information Bulletin when information on spacecraft experiments is available.

The entries in this summary are for satellites and space probes launched during the period January 1, 1978, to December 31, 1978. The information is arranged sequentially by launch date. Apoapsis and periapsis entries are in kilometers except for satellites and space probes with heliocentric orbits, where the entries are in astronomical units. Periods are in minutes except for satellites and space probes with heliocentric orbits, where the entries are in days. All inclinations are in degrees. International organizations are included under the country heading. An 'R' after the name of a country indicates that it was reimbursed for the launch.

# REPORT OF SATELLITE OR SPACE PROBE LAUNCHING

<u>COSPAR Designation</u>	<u>Popular Name</u>	<u>Launching Site</u>	<u>Launching Date</u>	<u>Universal Time</u>
1977-048A	GOES 2 (GOES-B)	Eastern Test Range	June 16, 1977	1051

<u>Transfer Orbital Elements on June 16, 1977</u>	<u>Apogee (km)</u>	<u>Perigee (km)</u>	<u>Period (min)</u>	<u>Inclination (degrees)</u>
	36,856	188	651.7	23.7

GOES 2, the second operational spacecraft of a series of Geostationary Operational Environmental Satellites, is intended to extend the knowledge and understanding of the atmosphere and its processes by viewing the evolution and motion of storms and other atmospheric phenomena. Both day and night information on the Earth's weather is provided to regional data-user stations through the use of a visual and infrared imaging instrument. The design life is 5 years. NASA launched the satellite with a Delta launch vehicle and is performing instrument checkout. After the spacecraft is declared operational, NOAA will operationally control the spacecraft.

## Physical Characteristics (size, shape, weight)

The geometric shape of the GOES 2 spacecraft is a cylinder 191 cm in diameter and 345 cm in length from the top of the magnetometer to the bottom of the apogee boost motor. The weight is approximately 628 kg.

## Transmitters (frequency and power)

Transmitting frequencies are 136.38 MHz at 2 to 8 W on VHF and 1694 MHz at 20 W on S-band.

## Scientific Experiments

<u>Objectives</u>	<u>Instruments</u>	<u>Experimenter(s) and Institution</u>
1. <u>Visible and Infrared Spin-Scan Radiometer (VISSR)</u> : To provide day and night information on the Earth's weather using eight identical channels for visible scan operation in the 0.55- to 0.70- $\mu$ m band and two channels for the infrared scan operation in the 10.5- to 12.6- $\mu$ m band	Spin-scan radiometer	NESS Staff NOAA/NESS Suitland, Maryland
2. <u>Meteorological Data System (MDS)</u> : To provide a capability for collecting data in a routine or emergency manner from remotely located collection platforms	Data collection and transmission systems	NESS Staff NOAA/NESS Suitland, Maryland
3. <u>Solar Energetic Particles</u> : To measure protons in the range of 1 to 500 MeV, alpha particles in the range of 4 to 400 MeV, and electrons greater than 0.5 MeV	Silicon solid-state detectors	Dr. D. J. Williams NOAA/ERL Boulder, Colorado
4. <u>Solar X-Ray Monitor</u> : To measure solar X rays in a range of 1 to 8 A	Collimator, two ionization chambers, and two electrometers	Dr. D. J. Williams NOAA/ERL Boulder, Colorado
5. <u>Magnetic Field Monitor</u> : To measure magnetic fields at 50, 100, 200, and 400 gamma	Biaxial, closed-loop, fluxgate magnetometer with two sensors	Dr. D. J. Williams NOAA/ERL Boulder, Colorado

Figure 2. Sample of Report of Satellite or Space Probe Launching

COSPAR DESIGNATION	SPACECRAFT NAME	COUNTRY	LAUNCH DATE	EPOCH DATE	ORBIT TYPE	APOAPSIS	PERIAPSIS	INCLINATION	PERIOD
1978-001A	COSMOS 974	U.S.S.R.	01/06/78	01/07/78	GEOCENTRIC	356.	188.	62.8	89.6
1978-002A	INTELSAT IVA F-3	INTERNATIONAL UNITED STATES-R	01/07/78	01/08/78	GEOCENTRIC	36478.	602.	21.8	651.3
1978-003A	SOYUZ 27	U.S.S.R.	01/10/78	01/11/78	GEOCENTRIC	302.	257.	51.6	89.9
1978-004A	COSMOS 975	U.S.S.R.	01/10/78	01/11/78	GEOCENTRIC	680.	637.	81.2	97.6
1978-005A	COSMOS 976	U.S.S.R.	01/10/78	01/11/78	GEOCENTRIC	11520.	1452.	74.	115.3
1978-005B	COSMOS 977	U.S.S.R.	01/10/78	01/11/78	GEOCENTRIC	11520.	1452.	74.	115.3
1978-005C	COSMOS 978	U.S.S.R.	01/10/78	01/11/78	GEOCENTRIC	11520.	1452.	74.	115.3
1978-005D	COSMOS 979	U.S.S.R.	01/10/78	01/11/78	GEOCENTRIC	11520.	1452.	74.	115.3
1978-005E	COSMOS 980	U.S.S.R.	01/10/78	01/11/78	GEOCENTRIC	11520.	1452.	74.	115.3
1978-005F	COSMOS 981	U.S.S.R.	01/10/78	01/11/78	GEOCENTRIC	11520.	1452.	74.	115.3
1978-005G	COSMOS 982	U.S.S.R.	01/10/78	01/11/78	GEOCENTRIC	11520.	1452.	74.	115.3
1978-005H	COSMOS 983	U.S.S.R.	01/10/78	01/11/78	GEOCENTRIC	11520.	1452.	74.	115.3
1978-006A	COSMOS 984	U.S.S.R.	01/13/78	01/14/78	GEOCENTRIC	291.	206.	62.8	89.5
1978-007A	COSMOS 985	U.S.S.R.	01/17/78	01/18/78	GEOCENTRIC	1032.	960.	83.	105.
1978-008A	PROGRESS 1	U.S.S.R.	01/20/78	01/22/78	GEOCENTRIC	348.	329.	51.6	91.3
1978-009A	MOLNIYA 3	U.S.S.R.	01/24/78	01/25/78	GEOCENTRIC	40631.	661.	62.8	736.
1978-010A	COSMOS 986	U.S.S.R.	01/24/78	01/25/78	GEOCENTRIC	341.	179.	65.	89.4
1978-011A	1978-011A	PEOPLE'S REP OF CHINA	01/26/78	01/26/78	GEOCENTRIC	479.	161.	57.0	90.9
1978-012A	IUE	UNITED STATES ESA	01/26/78	01/27/78	GEOCENTRIC	45887.	25669.	28.6	1435.7
1978-013A	COSMOS 987	UNITED KINGDOM U.S.S.R.	01/31/78	02/01/78	GEOCENTRIC	359.	183.	62.8	89.6
1978-014A	KYOKKO	JAPAN	02/04/78	02/06/78	GEOCENTRIC	3977.	642.	65.4	136.
1978-015A	COSMOS 988	U.S.S.R.	02/08/78	02/09/78	GEOCENTRIC	363.	210.	72.8	99.9
1978-016A	FLEETSATCOM 1	UNITED STATES	02/09/78	02/10/78	GEOCENTRIC	35978.	167.	26.5	634.2
1978-017A	COSMOS 989	U.S.S.R.	02/14/78	02/15/78	GEOCENTRIC	354.	178.	65.	89.5
1978-018A	ISS-B	JAPAN	02/16/78	02/17/78	GEOCENTRIC	1225.	972.	69.4	107.
1978-019A	COSMOS 990	U.S.S.R.	02/17/78	02/18/78	GEOCENTRIC	824.	783.	74.	101.
1978-020A	1978-020A	UNITED STATES	02/22/78	03/07/78	GEOCENTRIC	20308.	20095.	63.3	718.7
1978-021A	1978-021A	UNITED STATES	02/25/78	02/25/78	GEOCENTRIC	39377.	311.	63.2	703.7
1978-022A	COSMOS 991	U.S.S.R.	02/28/78	03/01/78	GEOCENTRIC	1022.	972.	83.	104.8
1978-023A	SOYUZ 28	U.S.S.R.	03/02/78	03/03/78	GEOCENTRIC	309.	269.	51.6	90.
1978-024A	MOLNIYA 1	U.S.S.R.	03/03/78	03/04/78	GEOCENTRIC	40733.	632.	62.8	736.
1978-025A	COSMOS 992	U.S.S.R.	03/04/78	03/05/78	GEOCENTRIC	346.	210.	71.4	89.8
1978-026A	LANDSAT 3	UNITED STATES	03/05/78	03/06/78	GEOCENTRIC	914.	897.	99.1	103.1
1978-026B	OSCAR 8	UNITED STATES	03/05/78	03/06/78	GEOCENTRIC	914.	897.	99.1	103.1
1978-027A	COSMOS 993	U.S.S.R.	03/10/78	03/11/78	GEOCENTRIC	368.	182.	72.9	89.7
1978-028A	COSMOS 994	U.S.S.R.	03/15/78	03/16/78	GEOCENTRIC	1023.	996.	82.9	105.
1978-029A	1978-029A	UNITED STATES	03/16/78	03/23/78	GEOCENTRIC	240.	160.	96.4	88.5
1978-029B	1978-029B	UNITED STATES	03/16/78	03/19/78	GEOCENTRIC	645.	639.	95.8	97.6
1978-030A	COSMOS 995	U.S.S.R.	03/17/78	03/18/78	GEOCENTRIC	262.	221.	81.4	89.1
1978-031A	COSMOS 996	U.S.S.R.	03/28/78	03/29/78	GEOCENTRIC	1021.	970.	82.9	104.8
1978-032A	COSMOS 997	U.S.S.R.	03/30/78	03/31/78	GEOCENTRIC	230.	200.	51.6	89.
1978-032B	COSMOS 998	U.S.S.R.	03/30/78	03/31/78	GEOCENTRIC	230.	200.	51.6	89.
1978-033A	COSMOS 999	U.S.S.R.	03/30/78	03/31/78	GEOCENTRIC	376.	180.	71.4	89.8
1978-034A	COSMOS 1000	U.S.S.R.	03/31/78	04/01/78	GEOCENTRIC	1024.	978.	83.	104.9
1978-035A	INTELSAT IVA F-6	INTERNATIONAL UNITED STATES-R	03/31/78	04/01/78	GEOCENTRIC	35949.	549.	21.8	641.0
1978-036A	COSMOS 1001	U.S.S.R.	04/04/78	04/05/78	GEOCENTRIC	249.	205.	51.6	88.7
1978-037A	COSMOS 1002	U.S.S.R.	04/06/78	04/07/78	GEOCENTRIC	305.	209.	65.	89.4
1978-038A	1978-038A	UNITED STATES	04/07/78	04/08/78	GEOCENTRIC	189.	149.	29.9	87.7
1978-039A	YURI	JAPAN UNITED STATES-R	04/07/78	04/08/79	GEOCENTRIC	35844.4	166.976	27.277	631.56
1978-040A	COSMOS 1003	U.S.S.R.	04/20/78	04/21/78	GEOCENTRIC	349.	185.	62.3	89.6
1978-041A	HCHH	UNITED STATES	04/26/78	04/27/78	GEOCENTRIC	646.	558.	97.6	96.7
1978-042A	DMSP-F3	UNITED STATES	05/01/78	05/02/78	GEOCENTRIC	653.	564.	97.6	96.89
1978-043A	COSMOS 1004	U.S.S.R.	05/05/78	05/06/78	GEOCENTRIC	311.	213.	62.8	89.4
1978-044A	OTS 2	ESA UNITED STATES-R	05/11/78	05/12/78	GEOCENTRIC	35942.	184.	27.3	633.8
1978-045A	COSMOS 1005	U.S.S.R.	05/12/78	05/13/78	GEOCENTRIC	672.	626.	81.2	97.6
1978-046A	COSMOS 1006	U.S.S.R.	05/12/78	05/13/78	GEOCENTRIC	417.	383.	65.8	92.5
1978-047A	1978-047A	UNITED STATES	05/13/78	05/22/78	GEOCENTRIC	20084.	19952.	63.1	711.3
1978-048A	COSMOS 1007	U.S.S.R.	05/16/78	05/17/78	GEOCENTRIC	384.	180.	72.9	89.8
1978-049A	COSMOS 1008	U.S.S.R.	05/17/78	05/18/78	GEOCENTRIC	551.	501.	74.	95.1
1978-050A	COSMOS 1009	U.S.S.R.	05/19/78	05/20/78	GEOCENTRIC	1378.	971.	66.	109.
1978-051A	PIONEER VENUS 1	UNITED STATES	05/20/78	12/04/78	VENUSCENTRIC	66614.	200.	105.	1440.
1978-052A	COSMOS 1010	U.S.S.R.	05/23/78	05/24/78	GEOCENTRIC	257.	218.	81.4	89.
1978-053A	COSMOS 1011	U.S.S.R.	05/23/78	05/24/78	GEOCENTRIC	1026.	978.	82.9	104.9
1978-054A	COSMOS 1012	U.S.S.R.	05/25/78	05/26/78	GEOCENTRIC	280.	214.	62.8	89.2
1978-055A	MOLNIYA 1 (78-055A)	U.S.S.R.	06/02/78	06/03/78	GEOCENTRIC	40837.	457.	62.5	736.
1978-056A	COSMOS 1013	U.S.S.R.	06/07/78	06/08/78	GEOCENTRIC	1539.	1456.	74.	115.6
1978-056B	COSMOS 1014	U.S.S.R.	06/07/78	06/08/78	GEOCENTRIC	1539.	1456.	74.	115.6
1978-056C	COSMOS 1015	U.S.S.R.	06/07/78	06/08/78	GEOCENTRIC	1539.	1456.	74.	115.6
1978-056D	COSMOS 1016	U.S.S.R.	06/07/78	06/08/78	GEOCENTRIC	1539.	1456.	74.	115.6
1978-056E	COSMOS 1017	U.S.S.R.	06/07/78	06/08/78	GEOCENTRIC	1539.	1456.	74.	115.6
1978-056F	COSMOS 1018	U.S.S.R.	06/07/78	06/08/78	GEOCENTRIC	1539.	1456.	74.	115.6
1978-056G	COSMOS 1019	U.S.S.R.	06/07/78	06/08/78	GEOCENTRIC	1539.	1456.	74.	115.6
1978-056H	COSMOS 1020	U.S.S.R.	06/07/78	06/08/78	GEOCENTRIC	1539.	1456.	74.	115.6
1978-057A	COSMOS 1021	U.S.S.R.	06/10/78	06/11/78	GEOCENTRIC	336.	180.	65.	84.9
1978-058A	1978-058A	UNITED STATES	06/10/78	07/01/78	GEOCENTRIC	35860.	35620.	0.5	1433.3
1978-059A	COSMOS 1022	U.S.S.R.	06/12/78	06/13/78	GEOCENTRIC	374.	182.	72.9	89.7
1978-060A	1978-060A	UNITED STATES	06/14/78	06/16/78	GEOCENTRIC	509.	276.	96.8	92.4
1978-061A	SOYUZ 29	U.S.S.R.	06/15/78	06/16/78	GEOCENTRIC	314.	270.	51.6	90.
1978-062A	GOES 3	UNITED STATES	06/16/78	06/17/78	GEOCENTRIC	36679.2	35469.1	1.7	1450.8
1978-063A	COSMOS 1023	U.S.S.R.	06/21/78	06/22/78	GEOCENTRIC	822.	784.	74.1	100.8
1978-064A	SEASAT 1	UNITED STATES	06/27/78	05/28/78	GEOCENTRIC	799.	769.	108.0	100.7
1978-065A	SOYUZ 30	U.S.S.R.	06/27/78	06/28/78	GEOCENTRIC	261.	197.	51.6	88.8
1978-066A	COSMOS 1024	U.S.S.R.	06/28/78	06/29/78	GEOCENTRIC	40000.	630.	62.8	726.
1978-067A	COSMOS 1025	U.S.S.R.	06/28/78	06/29/78	GEOCENTRIC	680.	649.	82.5	97.8
1978-068A	COMSTAR 1-B3	UNITED STATES	06/29/78	06/30/78	GEOCENTRIC	35852.	550.	21.8	639.2
1978-069A	COSMOS 1026	U.S.S.R.	07/02/78	07/03/78	GEOCENTRIC	261.	209.	51.8	89.
1978-070A	PROGRESS 2	U.S.S.R.	07/07/78	07/08/78	GEOCENTRIC	262.	193.	51.6	88.7
1978-071A	ESA-GEOS 2	ESA UNITED STATES-R	07/14/78	08/06/78	GEOCENTRIC	35774.1	35615.5	0.772	1431.2
1978-072A	MOLNIYA 1 (78-072A)	U.S.S.R.	07/14/78	07/15/78	GEOCENTRIC	40660.	650.	62.8	737.
1978-073A	RADUGA (78-073A)	U.S.S.R.	07/19/78	07/20/78	GEOCENTRIC	36590.	36590.	0.5	1478.
1978-074A	COSMOS 1027	U.S.S.R.	07/21/78	07/28/78	GEOCENTRIC	1014.	979.	82.9	104.8
1978-075A	1978-075A	UNITED STATES	08/05/78	08/13/78	GEOCENTRIC	39315.	380.	63.3	703.8
1978-076A	COSMOS 1028	U.S.S.R.	08/05/78	08/06/78	GEOCENTRIC	272.	182.	67.1	88.7

COSPAR DESIGNATION	SPACECRAFT NAME	COUNTRY	LAUNCH DATE	EPOCH DATE	ORBIT TYPE	APDAPSIS	PERIAPSIS	INCLINATION	PERIOD
1978-077A	PROGRESS 3	U.S.S.R.	08/08/78	08/09/78	GEOCENTRIC	249.	195.	51.6	88.7
1978-078A	PIONEER VENUS 2	UNITED STATES	08/08/78		VENUS PROBE				
1978-078B	PIONEER VENUS PROBE LRG	UNITED STATES	08/08/78		VENUS PROBE				
1978-078E	PIONEER VENUS PROBE SM	UNITED STATES	08/08/78		VENUS PROBE				
1978-078F	PIONEER VENUS PROBE SM2	UNITED STATES	08/08/78		VENUS PROBE				
1978-078G	PIONEER VENUS PROBE SM3	UNITED STATES	08/08/78		VENUS PROBE				
1978-079A	ISEE 3	UNITED STATES	08/12/78	11/25/78	HELIOCENTRIC	0.99	0.90	0.	365.
1978-080A	MOLNIYA 1 (78-080A)	U.S.S.R.	08/22/78	08/23/78	GEOCENTRIC	40768.	480.	62.8	736.
1978-081A	SOYUZ 31	U.S.S.R.	08/26/78	08/27/78	GEOCENTRIC	326.	271.	51.6	90.2
1978-082A	COSMOS 1029	U.S.S.R.	08/29/78	08/30/78	GEOCENTRIC	353.	186.	62.8	89.6
1978-083A	COSMOS 1030	U.S.S.R.	09/06/78	09/07/78	GEOCENTRIC	40100.	650.	62.8	726.
1978-084A	VENERA 11	U.S.S.R.	09/09/78		VENUS LANDER				
1978-085A	COSMOS 1031	U.S.S.R.	09/09/78	09/10/78	GEOCENTRIC	351.	191.	62.8	89.6
1978-086A	VENERA 12	U.S.S.R.	09/14/78		VENUS LANDER				
1978-087A	JIKI-KEH	JAPAN	09/16/78	09/16/78	GEOCENTRIC	30558.	230.	31.	533.
1978-088A	COSMOS 1032	U.S.S.R.	09/19/78	09/20/78	GEOCENTRIC	249.	218.	81.4	88.9
1978-089A	COSMOS 1033	U.S.S.R.	10/03/78	10/04/78	GEOCENTRIC	268.	223.	81.4	59.1
1978-090A	PROGRESS 4	U.S.S.R.	10/04/78	10/05/78	GEOCENTRIC	266.	191.	51.7	88.8
1978-091A	COSMOS 1034	U.S.S.R.	10/04/78	10/05/78	GEOCENTRIC	1483.	1422.	74.	114.9
1978-091B	COSMOS 1035	U.S.S.R.	10/04/78	10/05/78	GEOCENTRIC	1483.	1422.	74.	114.9
1978-091C	COSMOS 1036	U.S.S.R.	10/04/78	10/05/78	GEOCENTRIC	1483.	1422.	74.	114.9
1978-091D	COSMOS 1037	U.S.S.R.	10/04/78	10/05/78	GEOCENTRIC	1483.	1422.	74.	114.9
1978-091E	COSMOS 1038	U.S.S.R.	10/04/78	10/05/78	GEOCENTRIC	1483.	1422.	74.	114.9
1978-091F	COSMOS 1039	U.S.S.R.	10/04/78	10/05/78	GEOCENTRIC	1483.	1422.	74.	114.9
1978-091G	COSMOS 1040	U.S.S.R.	10/04/78	10/05/78	GEOCENTRIC	1483.	1422.	74.	114.9
1978-091H	COSMOS 1041	U.S.S.R.	10/04/78	10/05/78	GEOCENTRIC	1483.	1422.	74.	114.9
1978-092A	COSMOS 1042	U.S.S.R.	10/06/78	10/06/78	GEOCENTRIC	326.	187.	62.8	89.3
1978-093A	1978-093A	UNITED STATES	10/07/78	10/17/78	GEOCENTRIC	20312.	20285.	62.8	722.6
1978-094A	COSMOS 1043	U.S.S.R.	10/10/78	10/11/78	GEOCENTRIC	650.	625.	81.1	97.3
1978-095A	MOLNIYA 3 (78-095A)	U.S.S.R.	10/13/78	10/14/78	GEOCENTRIC	40825.	467.	62.8	736.
1978-096A	TIKOS-M	UNITED STATES	10/13/78	10/14/78	GEOCENTRIC	862.	846.	98.9	102.
1978-097A	COSMOS 1044	U.S.S.R.	10/17/78	10/18/78	GEOCENTRIC	315.	211.	62.8	89.5
1978-098A	NIMBUS 7	UNITED STATES	10/24/78	10/25/78	GEOCENTRIC	953.	938.	99.3	104.0
1978-098B	CAMEO	UNITED STATES	10/24/78	10/25/78	GEOCENTRIC	953.0	952.0	99.3	104.1
1978-099A	INTERCOSMOS 18	U.S.S.R.	10/24/78	10/25/78	GEOCENTRIC	768.	407.	83.	96.4
1978-099C	MAGION	CZECHOSLOVAKIA	10/24/78	10/25/78	GEOCENTRIC	768.	407.	82.96	96.4
1978-100A	COSMOS 1045	U.S.S.R.	10/26/78	10/27/78	GEOCENTRIC	1724.	1688.	82.6	120.4
1978-100B	RADIO 1	U.S.S.R.	10/26/78	10/27/78	GEOCENTRIC	1724.	1688.	82.6	120.4
1978-100C	RADIO 2	U.S.S.R.	10/26/78	10/27/78	GEOCENTRIC	1724.	1688.	82.6	120.4
1978-101A	PROGNOZ 7	U.S.S.R.	10/30/78	10/31/78	GEOCENTRIC	202965.	483.	65.	98.13
1978-102A	COSMOS 1046	U.S.S.R.	11/01/78	11/02/78	GEOCENTRIC	353.	212.	72.9	89.9
1978-103A	VEAO 2	UNITED STATES	11/13/78	11/14/78	GEOCENTRIC	476.	465.	23.5	94.0
1978-104A	COSMOS 1047	U.S.S.R.	11/15/78	11/16/78	GEOCENTRIC	378.	182.	72.9	89.8
1978-105A	COSMOS 1048	U.S.S.R.	11/17/78	11/18/78	GEOCENTRIC	824.	788.	74.0	101.
1978-106A	NATO 3-C	INTERNATIONAL	11/19/78	11/20/78	GEOCENTRIC	35891.	184.	27.2	632.8
1978-107A	COSMOS 1049	U.S.S.R.	11/21/78	11/22/78	GEOCENTRIC	375.	183.	72.9	89.7
1978-108A	COSMOS 1050	U.S.S.R.	11/28/78	11/29/78	GEOCENTRIC	298.	258.	62.8	89.8
1978-109A	COSMOS 1051	U.S.S.R.	12/05/78	12/06/78	GEOCENTRIC	1530.	1451.	74.	115.5
1978-109B	COSMOS 1052	U.S.S.R.	12/05/78	12/06/78	GEOCENTRIC	1530.	1451.	74.	115.5
1978-109C	COSMOS 1053	U.S.S.R.	12/05/78	12/06/78	GEOCENTRIC	1530.	1451.	74.	115.5
1978-109D	COSMOS 1054	U.S.S.R.	12/05/78	12/06/78	GEOCENTRIC	1530.	1451.	74.	115.5
1978-109E	COSMOS 1055	U.S.S.R.	12/05/78	12/06/78	GEOCENTRIC	1530.	1451.	74.	115.5
1978-109F	COSMOS 1056	U.S.S.R.	12/05/78	12/06/78	GEOCENTRIC	1530.	1451.	74.	115.5
1978-109G	COSMOS 1057	U.S.S.R.	12/05/78	12/06/78	GEOCENTRIC	1530.	1451.	74.	115.5
1978-109H	COSMOS 1058	U.S.S.R.	12/05/78	12/06/78	GEOCENTRIC	1530.	1451.	74.	115.5
1978-110A	COSMOS 1059	U.S.S.R.	12/07/78	12/08/78	GEOCENTRIC	360.	188.	62.8	89.7
1978-111A	COSMOS 1060	U.S.S.R.	12/08/78	12/09/78	GEOCENTRIC	360.	188.	62.8	89.7
1978-112A	1978-112A	UNITED STATES	12/11/78	12/14/78	GEOCENTRIC	20316.	20267.	63.3	722.4
1978-113A	1978-113A	UNITED STATES	12/14/78	12/14/78	GEOCENTRIC	36412.	35796.	2.5	1452.2
1978-114A	COSMOS 1061	U.S.S.R.	12/14/78	12/15/78	GEOCENTRIC	333.	211.	62.8	89.6
1978-115A	COSMOS 1062	U.S.S.R.	12/15/78	12/16/78	GEOCENTRIC	548.	508.	74.	95.1
1978-116A	TELESAT 4	CANADA	12/16/78	12/17/78	GEOCENTRIC	35896.	185.	27.3	632.9
1978-117A	COSMOS 1063	U.S.S.R.	12/19/78	12/20/78	GEOCENTRIC	661.	632.	81.2	97.4
1978-118A	HORIZONT	U.S.S.R.	12/19/78	12/20/78	GEOCENTRIC	48365.	22581.	11.3	1420.
1978-119A	COSMOS 1064	U.S.S.R.	12/20/78	12/21/78	GEOCENTRIC	991.	435.	83.	98.7
1978-120A	COSMOS 1065	U.S.S.R.	12/22/78	12/23/78	GEOCENTRIC	548.	344.	50.7	93.5
1978-121A	COSMOS 1066	U.S.S.R.	12/23/78	12/24/78	GEOCENTRIC	908.	848.	81.2	102.2
1978-122A	COSMOS 1067	U.S.S.R.	12/26/78	12/27/78	GEOCENTRIC	1226.	1184.	63.	109.2
1978-123A	COSMOS 1068	U.S.S.R.	12/26/78	12/27/78	GEOCENTRIC	408.	187.	62.8	90.2
1978-124A	COSMOS 1069	U.S.S.R.	12/28/78	12/29/78	GEOCENTRIC	290.	244.	62.8	89.8

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## APPENDIXES

### Appendix 1 - World Data Centers

World Data Centers conduct international exchange of geophysical observations in accordance with the principles set forth by the International Council of Scientific Unions (ICSU). They were established in 1957 by the International IGY Committee (CSA 3I) as part of the fundamental international planning for the International Geophysical Year program to collect data from the numerous and widespread IGY observational programs and to make such data readily accessible to interested scientists and scholars for an indefinite period of time. WDC-A was established in the U.S.A.; WDC-B, in the U.S.S.R.; and WDC-C, in Western Europe, Australia, and Japan. This new system for exchanging geophysical data was found to be very effective, and the operations of the World Data Centers were extended by ICSU on a continuing basis to other international programs; the WDC's were under the supervision of the Comité International de Géophysique (CIG) for the period 1960 to 1967 and are now supervised by the ICSU Panel on World Data Centers.

The current plans for continued international exchange of data through the World Data Centers are set forth in the Third Consolidated Guide to International Data Exchange through the World Data Centres, issued by the ICSU Panel on World Data Centres, December 1973. These plans are broadly similar to those adopted under ICSU auspices for the IGY and IQSY. A fourth revision was published in June 1979.

#### Functions and Responsibilities of WDC's

The World Data Centers collect data and publications for the following disciplines: Glaciology, Meteorology, Oceanography, Rockets and Satellites, Solar-Terrestrial Physics disciplines (Solar and Interplanetary Phenomena, Ionospheric Phenomena, Flare Associated Events, Geomagnetic Phenomena, Aurora, Cosmic Rays, Airglow), Solid-Earth Geophysics disciplines (Seismology, Tsunamis, Marine Geology and Geophysics, Gravimetry, Earth Tides, Recent Movements of the Earth's Crust, Rotation of the Earth, Magnetic Measurements, Paleomagnetism and Archeomagnetism, Volcanology, Geothermics). In planning for the various scientific programs, decisions on data exchange were made by the scientific community through the international scientific unions and committees. In each discipline the specialists themselves determined the nature and form of data exchange, based on their needs as research workers. Thus the type and amount of data in the WDC's differ from discipline to discipline.

The objects of establishing several World Data Centers for collecting observational data were: (1) to insure against loss of data by the catastrophic destruction of a single center; (2) to meet the geographical convenience of, and provide easy communication for, workers in different parts of the world. Each WDC is responsible for: (1) endeavoring to collect a complete set of data in the field or discipline for which it is responsible; (2) safekeeping of the incoming data; (3) correct copying and reproduction of data, maintaining

The WDC's conduct their operation at no expense to ICSU or to the ICSU family of unions and committees.

### World Data Center A

World Data Center A, for which the National Academy of Sciences through the the Geophysics Research (GRB) Board and its Committee on Data Interchange and Data Centers has overall responsibility, consists of the WDC-A Coordination Office and seven subcenters at scientific institutions in various parts of the United States. The GRB periodically reviews the activities of WDC-A and has conducted several studies on the effectiveness of the WDC system. As a result of these reviews and studies some of the subcenters of WDC-A have been relocated so that they could more effectively serve the scientific community. The addresses of the WDC-A subcenters and Coordination Office are given in Appendix 2. There are very close connections between WDC-A for Solar-Terrestrial Physics and WDC-A for Rockets and Satellites, which exchange solar-terrestrial geophysical data; if it is more convenient, data may be sent to one WDC-A subcenter through the other one.

The data received by WDC-A have been made available to the scientific community in various ways: (1) reports containing data and results of experiments have been compiled, published, and widely distributed; (2) synoptic type data on cards, microfilm, or tables are available for use at the subcenters and for loan to scientists; and (3) copies of data and reports are provided upon request.

Appendix 2 - WDC-A Coordination Office and Subcenters

WORLD DATA CENTER A  
National Academy of Sciences  
2101 Constitution Avenue, N.W.  
Washington, D.C. 20418  
U.S.A.

World Data Center A consists of the Coordination Office

and seven Subcenters:

World Data Center A  
Coordination Office  
National Academy of Sciences  
2101 Constitution Avenue, N.W.  
Washington, D.C. 20418  
U.S.A.  
[Telephone: (202) 389-6478]

*Glaciology:*

World Data Center A: Glaciology  
[Snow and Ice]  
Inst. of Arctic & Alpine Research  
University of Colorado  
Boulder, Colorado 80309  
U.S.A.  
[Telephone: (303) 492-5171]

*Meteorology (and Nuclear Radiation):*

World Data Center A: Meteorology  
National Climatic Center  
Federal Building  
Asheville, North Carolina 28801  
U.S.A.  
[Telephone: (704) 258-2850]

*Oceanography:*

World Data Center A: Oceanography  
National Oceanic and Atmospheric  
Administration  
Washington, D.C. 20235  
U.S.A.  
[Telephone: (202) 634-7249]

*Rockets and Satellites:*

World Data Center A for Rockets and  
Satellites  
Goddard Space Flight Center  
Code 601  
Greenbelt, Maryland 20771  
U.S.A.  
[Telephone: (301) 344-6695]

*Rotation of the Earth:*

World Data Center A: Rotation  
of the Earth  
U.S. Naval Observatory  
Washington, D.C. 20390  
U.S.A.  
[Telephone: (202) 254-4023]

*Solar-Terrestrial Physics* (Solar and  
Interplanetary Phenomena, Ionospheric  
Phenomena, Flare-Associated Events,  
Geomagnetic Variations, Magnetospheric  
and Interplanetary Magnetic Phenomena,  
Aurora, Cosmic Rays, Airglow):

World Data Center A  
for Solar-Terrestrial Physics  
Environmental Data Service, NOAA  
Boulder, Colorado 80303  
U.S.A.  
[Telephone: (303) 499-1000, Ext. 6467]

*Solid-Earth Geophysics* (Seismology,  
Tsunamis, Gravimetry, Earth Tides,  
Recent Movements of the Earth's  
Crust, Magnetic Measurements,  
Paleomagnetism and Archeomagnetism,  
Volcanology, Geothermics):

World Data Center A  
for Solid-Earth Geophysics  
Environmental Data Service, NOAA  
Boulder, Colorado 80303  
U.S.A.  
[Telephone: (303) 499-1000, Ext. 6521]

NOTES:

1. Communications regarding data interchange matters in general and World Data Center A as a whole should be addressed to: World Data Center A, Coordination Office (see address above).

2. Inquiries and communications concerning data in specific disciplines should be addressed to the appropriate subcenter listed above.